

Spring 2010

Volume 23 - No 2

ISSN 1042-198X
USPS 003-353

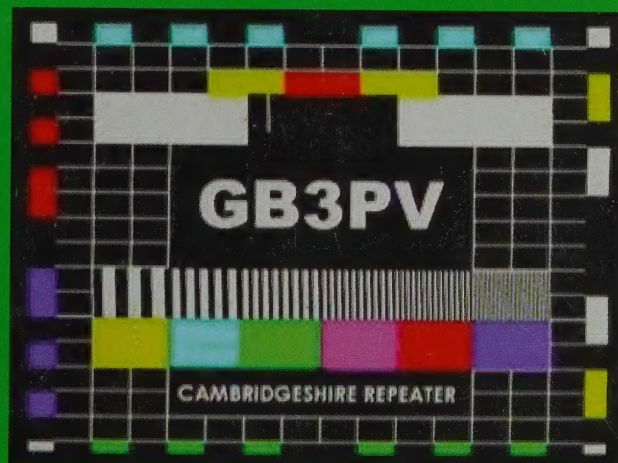
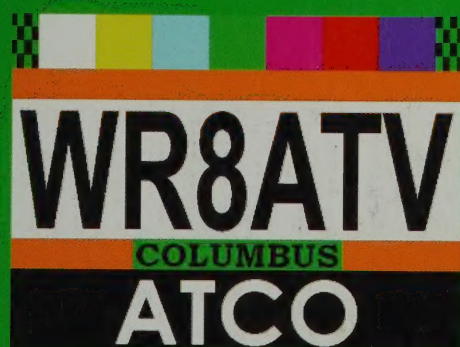
SINGLE ISSUE
\$5.50 USA
\$6.00 CANADA
\$8.00 ELSEWHERE

Amateur Television Quarterly

Digital Television Repeaters
from around the World

ATV at the Dayton
Hamvention

Linearize your Amplifier



GigaParts

www.gigaparts.com

Pocket-sized position reporting and communications.

**Integrated
APRS
Operation**

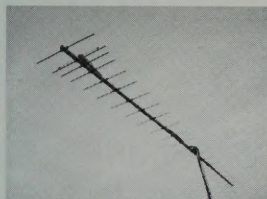
**Optional
GPS
Capability**



YAESU
Choice of the World's top DX'ers

VX-8DR

For more information go to www.gigaparts.com/vx8dr



BYERS CHASSIS KITS

Charles Byers K3IWK
5120 Harmony Grove Rd.
Dover, Pa. 17315-3016

Slot antennas original
manufacture by John
Schaffer, W3SST

www.flash.net/~k3iwk

Aluminum Chassis Kits and Cabinets and other Enclosures, Small sheets
Of Aluminum and Brass, VHF and UHF Antennas for CW, SSB, ATV,
and Delrin Insulators and Stainless Steel Keepers for 3/16" and 1/4" elements.



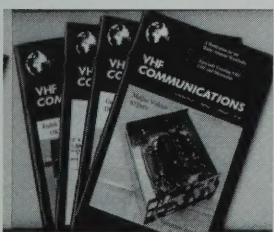
TV-AMATEUR die deutsche Amateurfunk-Zeitschrift für ATV bringt in der letzten Ausgabe z. B.

- Zweikanal-Audioverstärker wandelt Stereo in Monosignale
- Frequenznutzungsplan vom September
- Tongenerator mit 8 Pegelstufen
- Erste HDTV-Bilder vom Mond
- aktuelle ATV-Relais-Liste
- DVB-T-Sendeversuche DD1KU

bestellen per Fax: 001149 231 48 99 2
oder Internet: www.agaf.de



VHF Communications



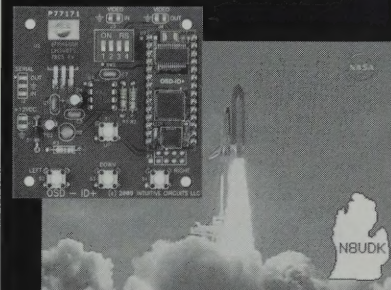
- A Publication for The Radio Amateur Worldwide
- Articles Covering VHF, UHF and Microwaves
- Design, Construction and Testing Information
- PCBs and Kits Available

Four magazines per year, £19.00 cash or £20.00 credit card, including surface mail delivery

For more information or to subscribe – <http://www.vhfcomm.co.uk>
email - vhfsubs@vhfcomm.co.uk

63 Ringwood Road, Luton, Beds, LU2 7BG, U.K. tel / fax +44 1582 581051

OSD-ID+ with Carrier Board



OSD-ID+™ is a single channel, stand-alone static character and graphic composite video overlay circuit. This user programmable device can display up to 30 columns by 12 rows (NTSC) or 15 rows (PAL) of text and imported graphics such as logos directly onto an incoming composite video source. If no video input source is available then OSD-ID+™ overlays text and graphics onto a self-generated background screen. The overlay can be configured to always display, appear on a configurable timer (e.g. every 10 minutes for 30 seconds), or appear on an external button press.

Included with OSD-ID+™ is font editing software. OSD-ID+™ firmware upgrades are supported via a PC connection.

\$129.00

Intuitive Circuits, LLC

Voice: (248) 588-4400
<http://www.icircuits.com>

If You Move

Please send us your NEW ADDRESS! We pay 70 cents for each returned ATVQ. And we are usually nice and send another copy to your new address which costs us \$1.29. Please help us from having to do this. Thanks!

AMATEUR TELEVISION QUARTERLY

Published by
ATV Quarterly

Publisher/Managing Editor

Bill Brown - WB8ELK

Publisher/Technical Editor

Mike Collis - WA6SVT

Editor

Denise Camp

Art Director

Jeff Brown - N8UEJ

Subscriptions / Advertising

Mike Collis WA6SVT

P.O. Box 1594

Crestline, CA 92325

(909) 338-6887 - voice

email: wa6svt@atvquarterly.com

Article Submissions / Ad copy

Bill Brown WB8ELK

107 Woodlawn Dr.

Madison, AL 35758

(256) 772-6000 - voice

email: wb8elk@atvquarterly.com

Website:

<http://www.atvquarterly.com>

Amateur Television Quarterly (ISSN 1042-198X) is published quarterly, in January, April, July, and October for \$20.00 per year by ATV Quarterly Magazine, P.O. Box 1594, Crestline, California 92325. Periodicals Postage Paid at Crestline, CA and additional mailing offices. POSTMASTER:

Send address changes to:

Amateur Television Quarterly,
P.O. Box 1594, Crestline, CA 92325.

Amateur Television Quarterly is available by subscription for \$20.00/yr in the USA; \$22.00/yr in Canada; \$29.00/yr elsewhere. Single issues \$5.50/USA; \$6.00/Canada; \$8.00 elsewhere.

Amateur Television Quarterly TABLE OF CONTENTS

Sync Buzz Editorial

5 *Bill Brown WB8ELK
Mike Collis WA6SVT*

**DATV Repeater designs from
around the World**

6 *Ken Konechy W6HHC
Robbie Robinson
KB6CJZ*

Amplifier Linearization

18 *Mike Collis WA6SVT
Bob Miller W6KGE*

White Tank ATV Repeater

22 *Mike Collis WA6SVT*

Dayton Hamvention ATV

24 *Art Towslee WA8RMC*

ATCO Red-White-Boom

26 *Art Towslee WA8RMC*

ATVQ Editor Denise Camp SK 28 *Bill Brown WB8ELK*

Crossword

(answers from Winter puzzle) 32 *Denise Camp*

Advertiser Index/ATVQ Stores 33

Sync Buzz Editorial

- Bill Brown WB8ELK and Mike Collis WA6SVT

As many of you may know, we lost our Editor Denise Camp this past April. In addition to her amazing editing skills, she has written quite a number of articles for us during the past few issues. We are still reeling from her loss and putting this issue together without her really drives home how much we relied on her.

Please take a moment to read our tribute to Denise on page 28.

Digital ATV

This issue we take with a round-the-World tour of digital ATV repeaters thanks to Ken W6HHC and Robbie KB6CJZ.

We plan to feature more articles about DATV in upcoming issues.

We are not leaving the analog ATV world and will be highlighting analog ATV circuits and design as well in upcoming issues.

Next up in the Q

In the next issue we will be featuring articles about remotely controlling your ATV station via the Internet, a portable ATV repeater, the amazing Hawaii to California ATV path with photos of Paul KH6HME's beacon station and Gordon West WB6NOA's reception over a 2500 mile plus path on 70cm. We'll also be reviewing the new Intuitive Circuits ID generator (see the ad on page 3).

Stay Tuned,

- Bill and Mike

ATVQ

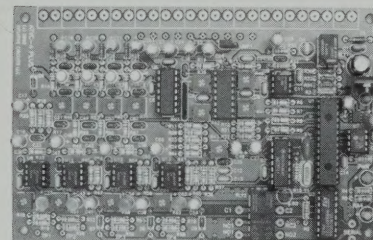
ATVC-4 Plus

Amateur Television Repeater Controller

ATVC-4 Plus is Intuitive Circuit's second generation Amateur Television repeater controller. ATVC-4 Plus has many features including:

- Five video input sources
- Four mixable audio input sources
- Non-volatile storage
- DTMF control
- Beacon mode
- Robust CW feedback
- Password protection
- Many more features

For example a major new feature is four individual sync detection circuits allowing for true priority based ATV receiver switching. \$349.00



Intuitive Circuits, LLC

3928 Wardlow Ct. - Troy, MI - (248) 588-4400

<http://www.icircuits.com>

THE R. F. CONNECTION

"specialist in

R F Connectors and Coax"

<http://www.therfc.com>

301/840-5477

Fax 301/869-3680

e-mail: rfc@therfc.com

Order Line 800-783-2666

Suite 11, 213 N. Frederick Ave.

Gaithersburg, MD 20877

DATV Repeater Designs from around the World

Originally appeared in the Orange County ARC Newsletter

Ken Konechy W6HHC and Robbie Robinson KB6CJZ

This article on DATV (Digital-ATV) technology looks at the design of eight different types of DATV repeater designs.

First, we will look at a very simple DATV repeater design that is proposed for the OCARC club in the future.

Then we will look at the first operational DATV repeater in the US, WR8ATV in Columbus, Ohio.

Next, we will look at the design of the first DATV repeater in Australia to go 100% DATV transmis-

sions, VK3RTV near Melbourne.

Finally, we go off to Europe and look at GB3BH, GB3PV, and GB3KM in England and look at DBØDLH and DBØSRS in Germany. We find it fascinating to study the different approaches that hams can use for DATV with repeaters!

Proposed W6ZE DATV Repeater Design

If testing of cross-town DATV simplex portable session by W6HHC and KB6CJZ continues to go well, then there are future plans being proposed

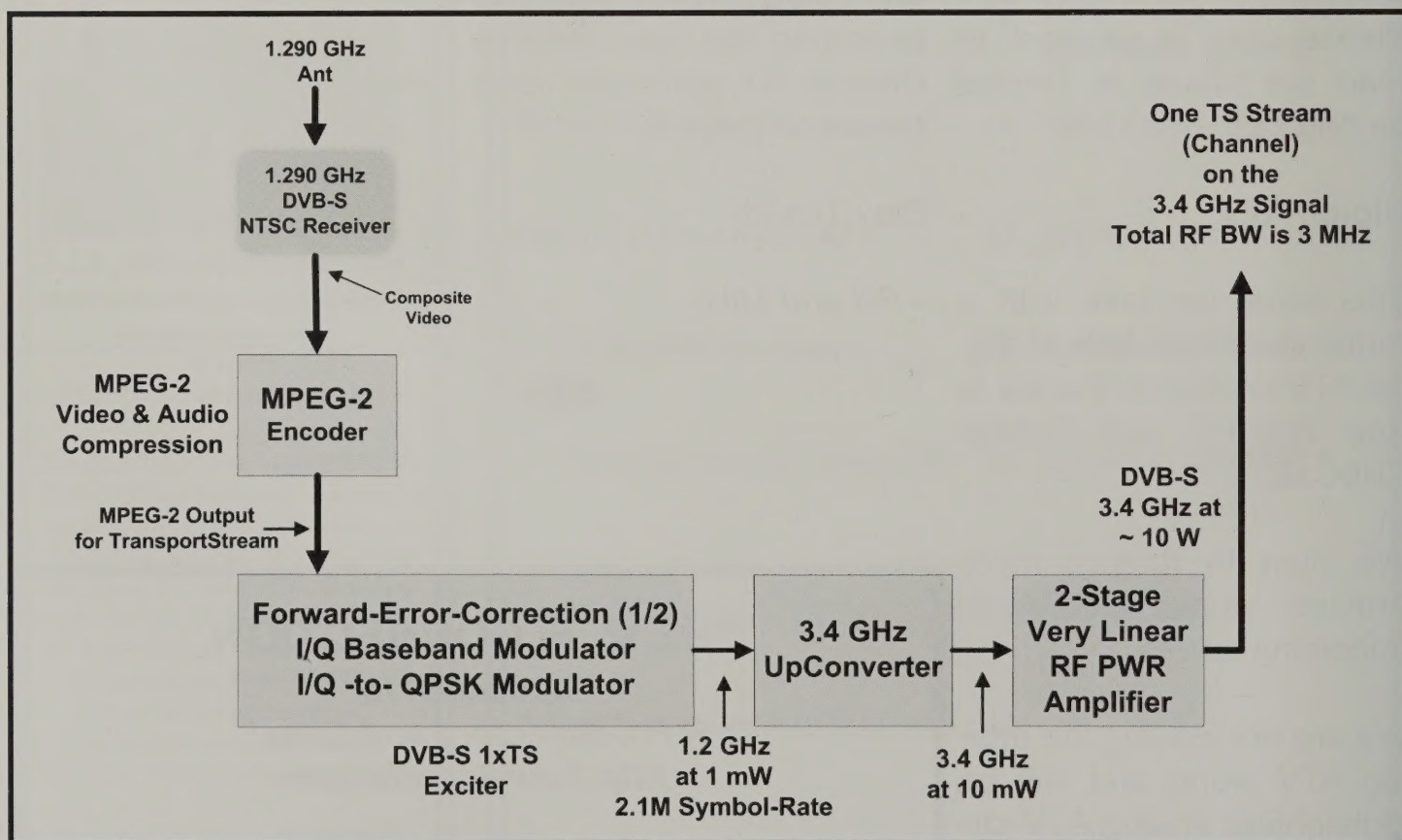


Figure 1 - Block diagram showing simple planned DATV repeater design for W6ZE

to add DATV repeater for OCARC use. This repeater has a very simple design compared to later ones we will look at:

- DVB-S Uplink on 1.2 GHz
- DVB-S Downlink on 3.4 GHz
- Downlink RF Bandwidth is 3 MHz
- One Transport Stream Channel (1xTS)

This choice of frequencies is highly influenced by crowded band-plan conditions here in Orange County, near the city of Los Angeles.

As shown in **Figure 1**, there is a single DATV uplink receiver on 1.2 GHz feeding a single DATV transmitter on 3.4 GHz. The DVB-S receiver planned for the W6ZE repeater is a "satellite" SetTopBox. This type of STB is commonly called

"Free-To-Air" (aka FTA) and can be easily found used on e-Bay.

The choice of symbol-rate of 2.1 M Symbols/sec for NTSC and a Forward Error Correction setting of 1/2 provides a significant error correction redundancy factor of 1/2 while still obtaining a narrow DATV RF bandwidth of only 3 MHz.

WR8ATV DATV Repeater Design

A block diagram of the current WR8ATV DATV repeater in Columbus, Ohio is shown in **Figure 2** on the following page. The Amateur Television of Central Ohio (ATCO) runs the only currently active DATV repeater in the United States. The WR8ATV repeater design is more complex than

Cont. on Page 8

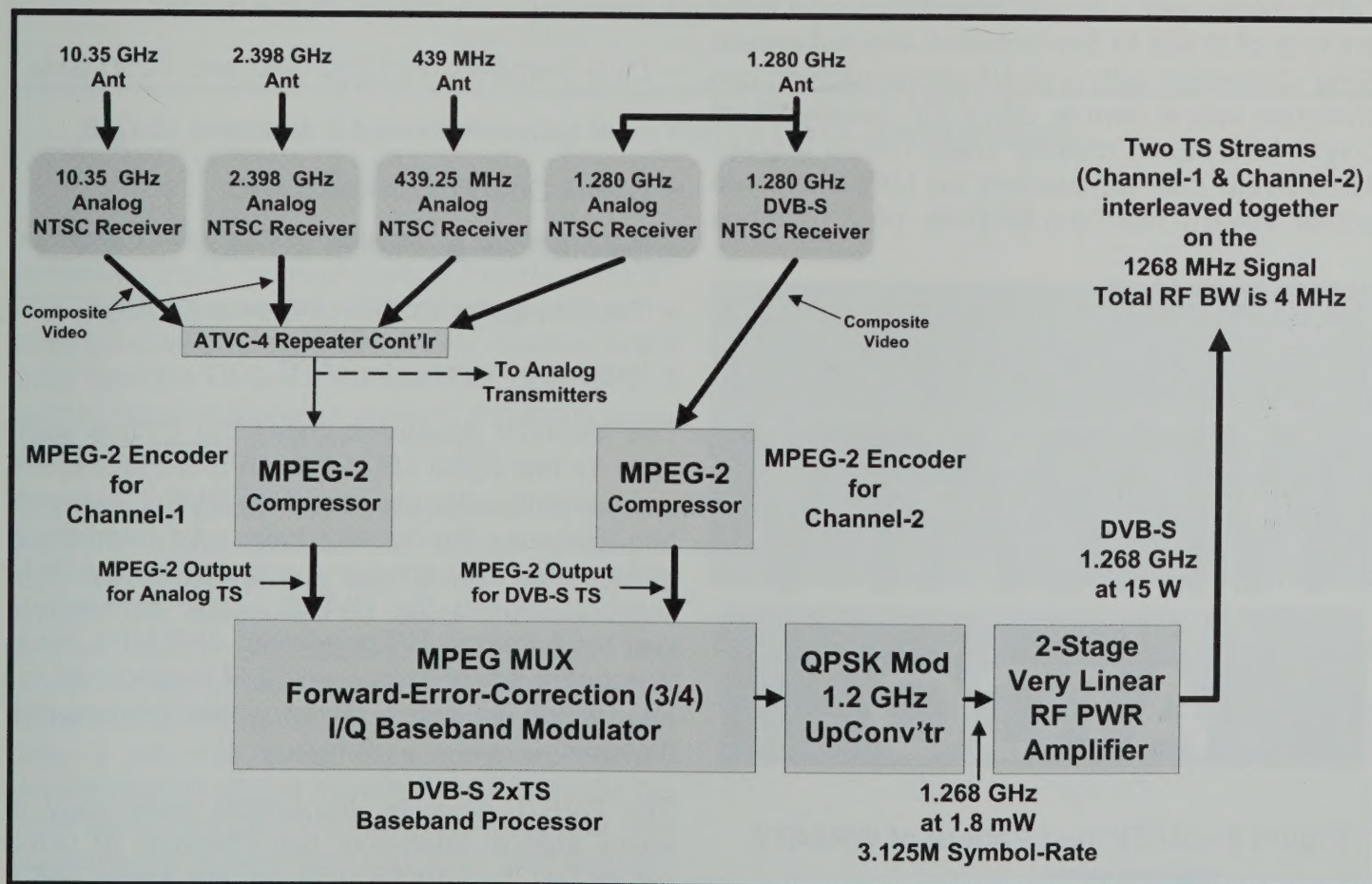


Figure 2 - Block diagram showing the WR8ATV DATV repeater design

the simple repeater design that we showed in

(when configured at FEC 3/4).

Fig 1:

- DVB-S Uplink on 1.2 GHz
- Analog uplink on 439 MHz, 1.2, 2.4 & 10 GHz
- DVB-S Downlink on 1.2 GHz
- Downlink RF Bandwidth is 4 MHz
- Two Transport Stream Channels (2xTS)
- Internet-streaming to BATC

In January of 2004 the ATCO Group in Columbus, Ohio installed a DVB-S digital output to their repeater which has been in service 24-7 since then.

The WR8ATV DATV repeater design allows two channels to be simultaneously interleaved on one DATV transmission signal. The choice of a symbol-rate of 3.125 M Symbols/sec and a Forward Error Correction setting of 3/4 allows packing two channels into a narrow DATV RF bandwidth of only 4 MHz. Each channel uses 1.5625 MS/sec symbol-rate that will support an MPEG-2 video output stream Net-Data-Bit-Rate of 2.16 mbps

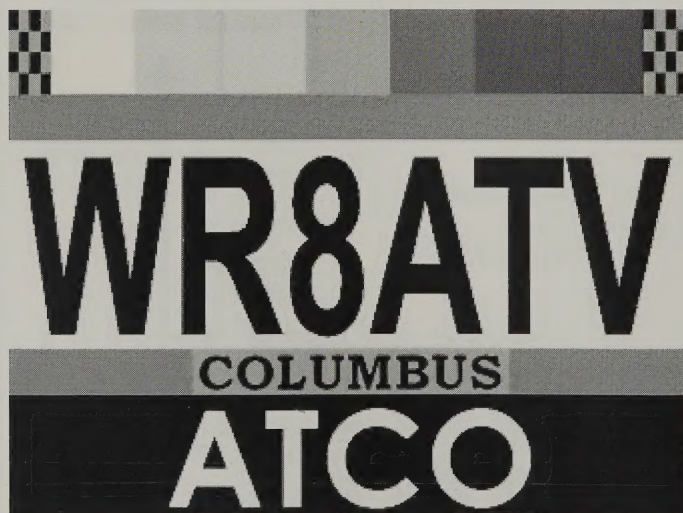


Figure 3 – DATV Test Pattern of WR8ATV

VK3RTV DATV Repeater Design

The VK3RTV Amateur TV repeater near Melbourne has been transmitting analogue ATV pictures for 30 years. In September 2009, VK3RTV began transmitting only Digital-ATV using the terrestrial standard, DVB-T. As Peter-VK3BGM, custodian for the VK3RTV repeater, told us "...The quality has taken a quantum leap over the old analogue to analogue system, although I felt a bit of a 'pang' when I de-commissioned [the analogue repeater output]....".

The block diagram for the VK3RTV DATV repeater design is shown in **Figure 4**, on the following page. The VK3RTV DATV repeater design is also very complicated (in our minds):

- DVB-S Uplinks on 1.250 GHz and 1.280 GHz
- Analogue uplinks on 1.2 GHz and 10 GHz
- DVB-T Downlink on 446.5 MHz
- Downlink RF Bandwidth is 7 MHz
- Two Transport Stream Channels (2xTS)
- Internet-streaming to BATC

The VK3RTV designers chose the DVB-S standard for the digital uplinks as DVB-S transmitters are currently a lot cheaper than DVB-T transmitters. Because the Aussies have a lot of band space in Australia, they are using a symbol-rate of 5 M Symbols/sec for the DVB-S uplink transmitters that produces an RF bandwidth of 7 MHz. Most Europeans seem to be using 2 M symbol-rate for PAL which pixelates on very fast camera-pan motion.

The DVB-T downlink transmitter technology is easily able to interleave two channels of video (VK3RTV1 and VK3RTV2) on the same 446.5 MHz signal within a total RF bandwidth of 7 MHz. Channel VK3RTV1 displays either the input from the analogue 1.250 GHz receiver or the input from the DVB-S STB tuned to 1.250 GHz. If no signal

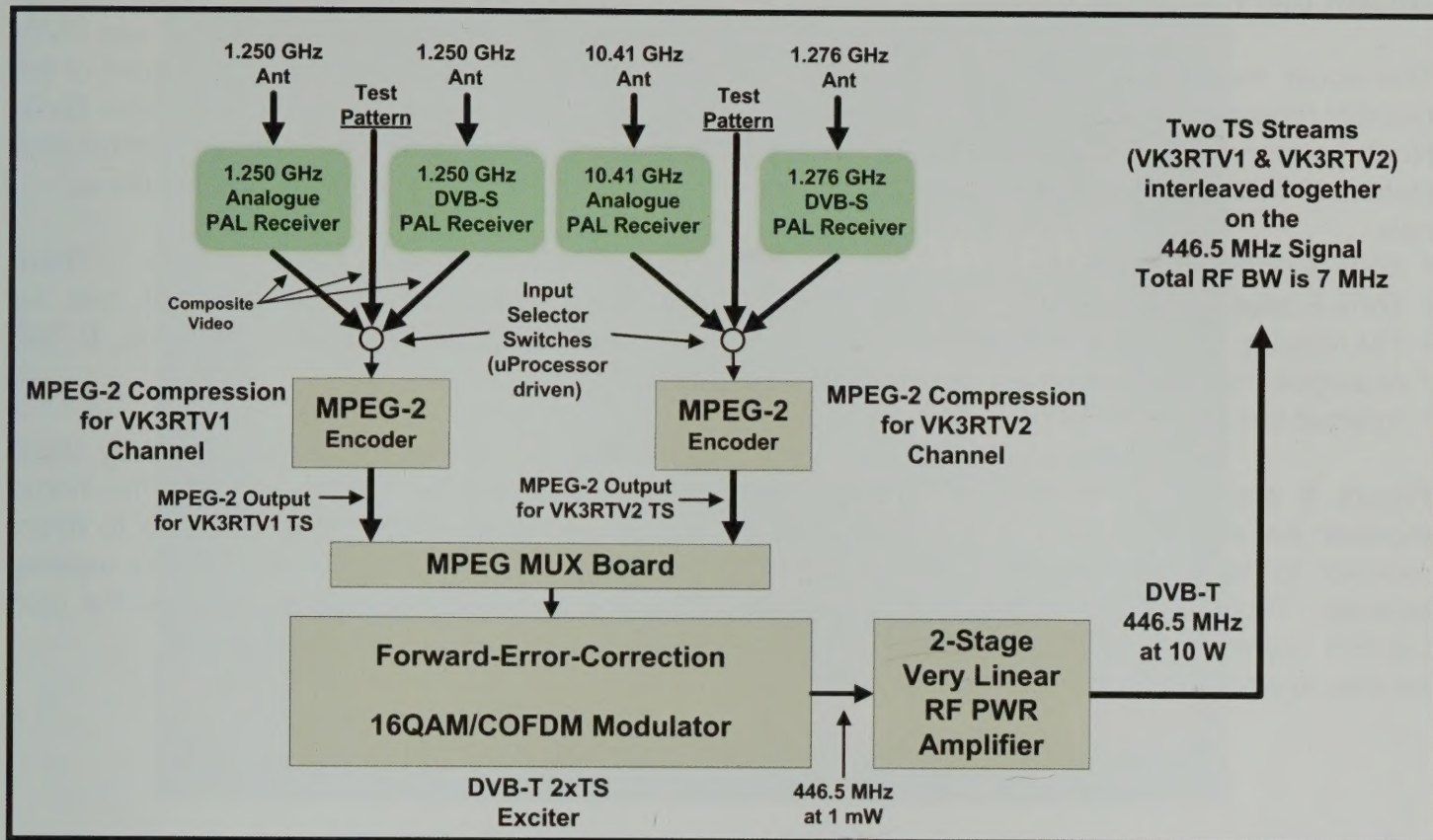


Figure 4 - Block diagram showing the VK3RTV DATV repeater design

is present from either receiver, a microprocessor controlled input selector switch inserts a TEST PATTERN. Channel VK3RTV2 displays either the input from the analogue 10.41 GHz receiver or the input from the DVB-S STB tuned to 1.280 GHz. If neither receiver signal is present, the input selector switch inserts a TEST PATTERN.

One aspect that we think is very clever...is that the VK3RTV team decided to cut-off analogue repeater transmissions and go to 100% DATV output, but continued to allow the analogue uplinks. DATV SetTopBoxes are cheap. This move forced all the members to buy low-cost Terrestrial STBs as STEP 1. But, at the same time it did not cut-off their home analog ATV transmitters. It allows members to migrate to the more expensive DATV home transmitters at their convenience. A very neat migration plan for moving from analogue ATV to DATV!!!



Figure 5 - VK3RTV screen shot from first tests

Cont. on Page 10



GB3BH DATV Repeater Design

The South West Herts UHF Group operates the GB3BH repeater that is located in Bushey Heath, North London. As their Test Card shown in **Fig 7** states, 10 Million people live in range of their signals.

- DVB-S Uplink on 1.2 GHz
- DVB-S relaying from GB3TZ repeater
- FM relaying from GB3HV repeater
- Analogue FM Downlink on 2.4 GHz and 10 GHz
- Internet-streaming to BATV

Figure 6 shows that there is a DVB-S uplink receiver on 430 MHz and a 2.3 GHz DVB-S receiver to relay the signals from the GB3TZ repeater. 70cm DATV is a new band for the GB3BH members and it interesting for them to be able to work long distances on that band.

Dave Mann G8ADM explains their choice of DVB-S for the GB3BH uplinks "...We do not use DVB-T on the amateur bands in the UK because of the high bandwidth requirements, 8 MHz. With DVB-S the RF bandwidth is similar to the symbol rate and the Power Amp linearity is not so critical."

Dave G8ADM further pointed out that "...There are many repeaters in the UK that can be switched to digital or analogue using DTMF tones."

Streaming to the internet, is performed by Dave M0SAT receiving the 10 GHz signal at his home station and uses Adobe Flash Encoder to direct the stream to the BATC.TV web site for viewing (See the Internet-Streaming side bar on the next page).

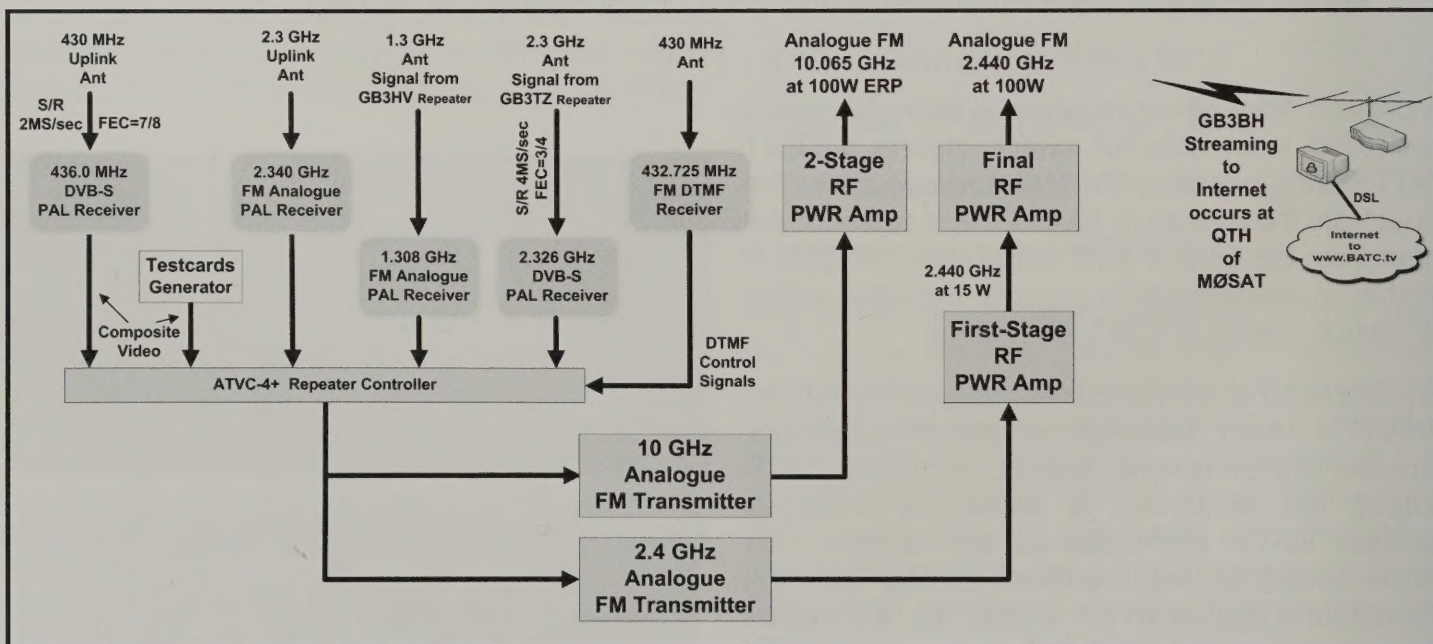


Figure 6. Block diagram of the DATV repeater design for GB3BH

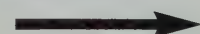


Figure 7 - Typical test card of GB3BH

Ever wonder how to stream your video onto the internet? The DATV repeaters that we studied in this article all receive the ATV signal at a local ham station (where a DSL line exists) and then inject the received (composite) video into a PC using "video capture" hardware such as the typical USB unit seen below.

An application software program can then direct the video-and-audio stream from the PC to a remote WEB site. The app software favored by England is the Adobe Flash Media Live Encoder 3 (free download from Adobe). There are two app software programs favored by the German hams: open-source VideoLan Client (called VLC) and open-source NullSoft Video (called NSV). The viewing web-site runs a server type software to allow many people to watch at one time.

British hams stream to **www.BATC.TV** for viewing
German hams stream to **www.D-ATV.net** to view



GB3KM DATV Repeater Design

The Kirk Merrington DATV Repeater is located about 225 miles North of London. The block diagram for the GB3KM DATV repeater design is shown in Fig 8.

- DVB-S Uplink on 1.280 GHz
- Analogue Uplinks on 1.2 GHz, 2.3 & 10 GHz
- Analogue FM Downlinks on 2.4 and 10 GHz
- Internet-streaming to BATC

Currently the two output transmitters on the GB3KM repeater are both FM analogue. The same video is run simultaneously to the 2.4 and 10 GHz transmitters. Rob Swinbank M0DTS explains that "...We run a full duplex repeater so we have decided that a digital output is not the best option for us. This is due to the combined input and output delay in full duplex digital opera-

tion being in the order of 2 seconds.... not good enough for us!. Even 1 second of delay is not easy when more than two stations are in the same QSO with each other."

Rob reported that he is planning to add DATV on the 436 MHz band. "70cm seems to be the best choice over here for us as the digital signal is more 'friendly' to other users on 70cm band and should yield better DX!"

Streaming to the internet, is performed by Rob M0DTS receiving the 10 GHz signal at his home station and injects it into the internet to be viewed at www.BATC.TV. He also uses the free-download Adobe Flash Media Live Encoder 3 software program on his PC and his home DSL line to achieve the video-streaming to the BATC site.

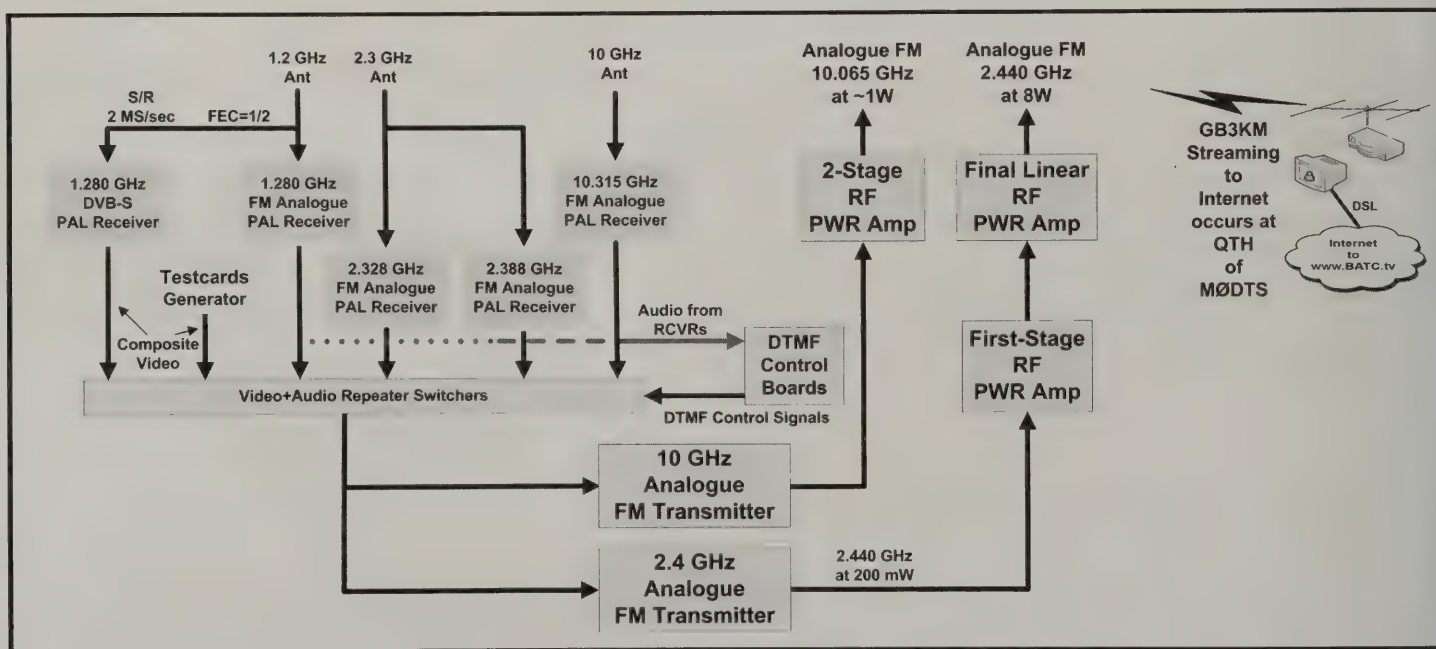


Figure 8 - Block diagram showing GB3KM DATV repeater design

GB3PV DATV Repeater Design

The GB3PV DATV repeater is operated by Cambridge Repeater Group and is located in Madingley, Cambridgeshire - about 50 miles North of London. The block diagram for the GB3PV DATV repeater design is shown in **Fig 9**.

- Analogue FM Uplink on 1.2 GHz
- A planned DVB-S uplink for 1.2 GHz
- DVB-S Downlink on 1.3 GHz
- Analogue FM Downlink on 1.3 GHz
- Internet-streaming to BATC

As Gavin Nesbitt M1BXF explains "...The repeater group uses single RX and TX frequency on GB3PV mainly due to the restrictions from the CAA (Civil Aviation Authority). Using DTMF it is possible to switch the TX between analogue and digital. The beacon also alternates between analogue & digital."

Ken W6HHC also had some interesting conversations on DATV RF Bandwidth with Brian Shaw G6HFS of the Cambridge Repeater Group. Brian G6HFS had remeasured the GB3PV RF BW for Ken and reported that it was about 4.2 MHz, very close to the GB3PV SymbolRate of 4.165 M Symbols/Sec. That was also the value of BW that

Prof. Uwe Kraus DJ8DW of the German AGAF group had told the repeater group to expect. In our TechTalk76 article (OCARC newsletter) on DVB-S BW, we had reported that QPSK bandwidth is stated as

$$\text{RF BW} = \sim 1.33 \times \text{SymbolRate}$$

This formula would result in an expected BW of 5.6 MHz, not 4.2 MHz? Why is there a difference?? You may have noticed the hams at GB3BH also equate DVB-S Bandwidth with S/R, too. See Further BW Discussions in the side bar on page 15.

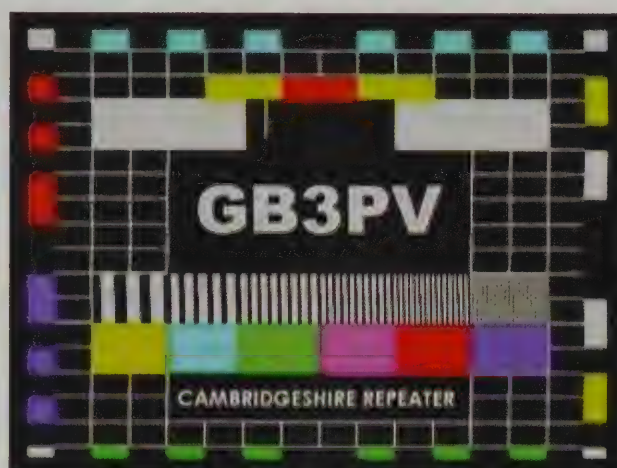


Figure 10 - Test card stream from GB3PV

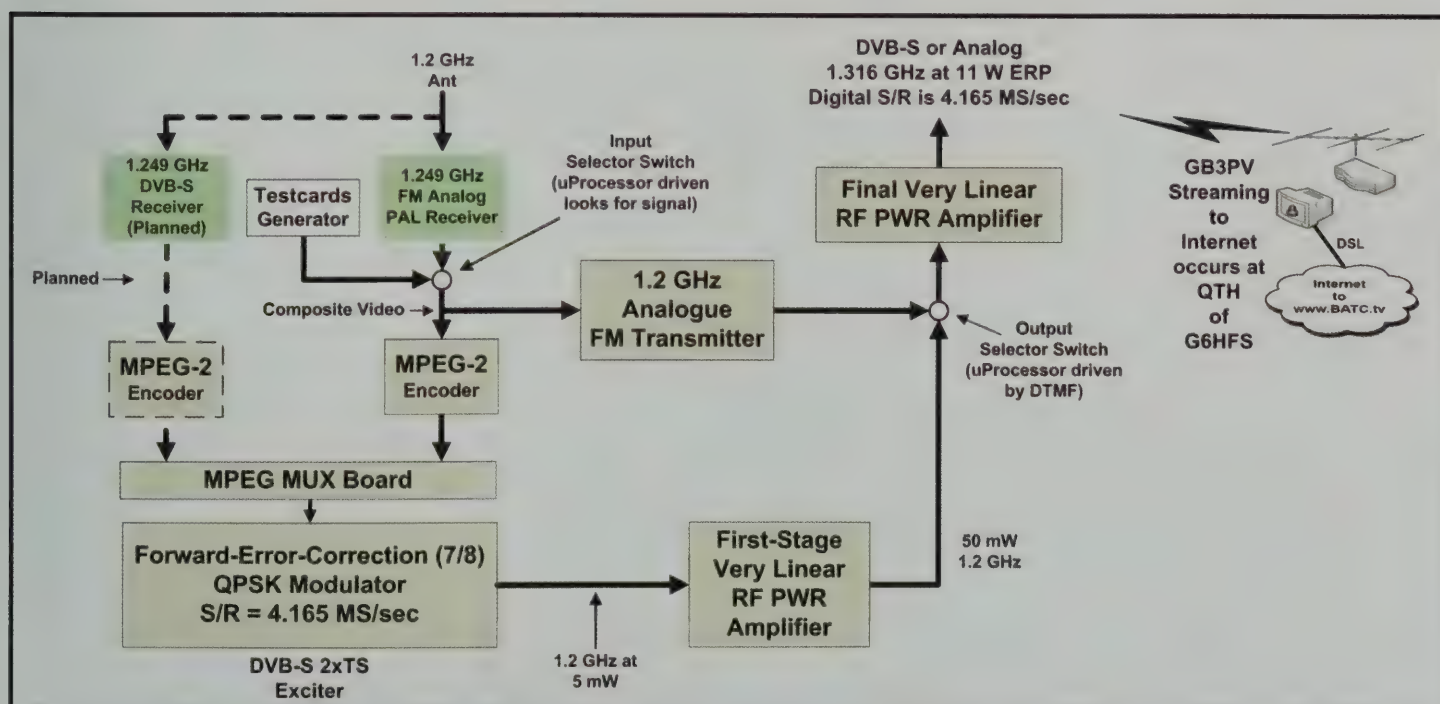


Figure 9 - Block diagram showing the GB3PV repeater design

DBØDLH DATV Multimedia Repeater Design

The DBØDLH DATV repeater is operated by the Lufthansa Amateur Radio Club Hamburg and located at the Hamburg-airport (HAM) in Northern Germany (near the Denmark border).

- DVB-S Uplinks on 2.355 GHz
- Analogue uplinks on 2.3 GHz and 10 GHz
- DVB-S relaying from six repeaters
- Analog Downlink on 2.4 GHz and 10 GHz
- DVB-S re-distribution by DBØFS repeater
- Internet Streaming by two external sources

We were very impressed that the DBØDLH repeater also has SKYPE input that is selectable. Notice in Fig 11 that the DBØDLH repeater relays six DATV signals coming from repeaters outside of Hamburg. These include DBØDAN, DBØEUF, DBØFS, DBØHEX, and DHØHMB repeaters. As Hans Hass DC8UE explains "... It is a living repeater and we are always modifying and changing the possibilities....". Their selection and switching and "quattro-picture-in-picture" (see **Figure 12**) capabilities for DBØDHL are very impressive.

Hans DC8UE also explained that "...The 10GHz-signal is running a short way to the DBØFS repeater and is there received and coded to generate a digital DVB-S-signal. After muxing with three local produced videos, this signal is then digitally re-distributed on 1288MHz (DVB-S FEC 3/4) from the DBØFS tower to DBØDAN and DBØEUF repeaters. The reason for this complex way is the circumstance, that DBØDLH cannot directly pass to the DBØDAN or DBØEUF repeaters, because the location DBØDLH is not high enough."

Streaming to the internet occurs at two different locations. The DBØDLH signal is received over the air at the DMØHMB repeater site and then sent over the internet to www.d-atv.net/db0dlh.asx in the VLC-mode (requiring a VLC-player to be watched). The DBØDLH signal is received over the air at the DFØWFB repeater site and then sent over the internet to www.d-atv.net/db0dlh.m3u in the NSV-mode (that requires a WinAmp-player to be watched).

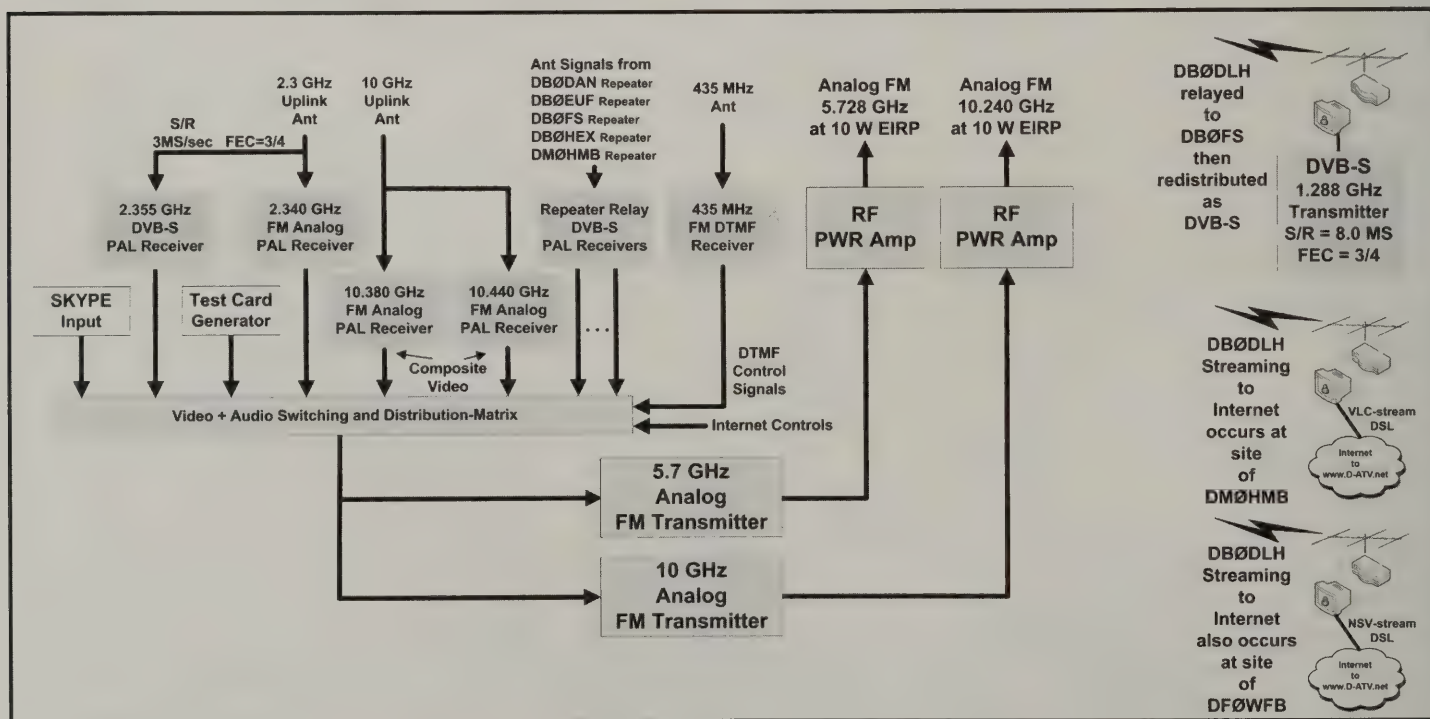


Figure 11 - Block diagram showing the DBØDLH DATV repeater design

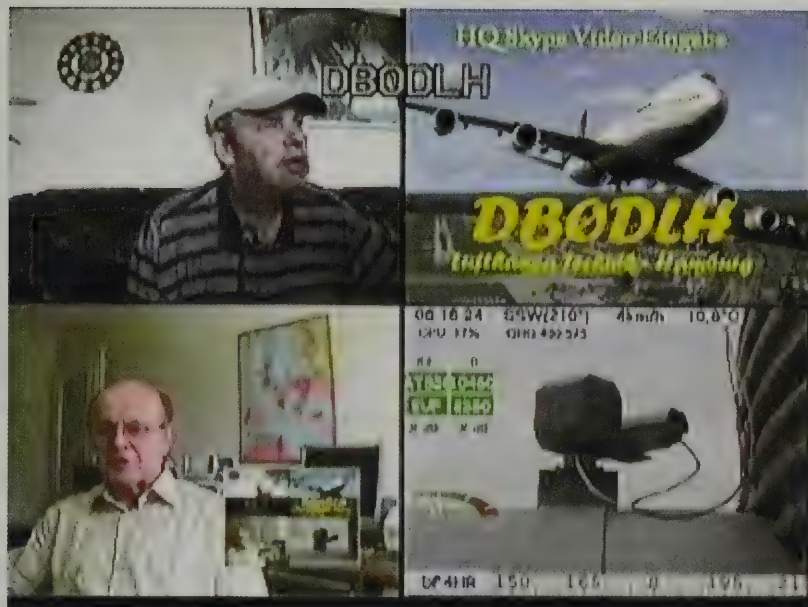


Figure 12 -

Typical DL0DLH
"quadro" live picture
on Internet Stream

Further Discussions on DVB-S RF Bandwidth

Through searches on the internet, we have confirmed that there are three ways for defining RF BandWidth for QPSK modulation.

"minus 3 dB" bandwidth method

With this method, bandwidth is measured at the points that are down 3 dB. This is a typical method for measuring a filter bandwidth and represents the "half-power point" if you are looking at voltage on a spectrum-analyzer. (Symbol-Rate is shown as S/R.) Mathematically, $BW-3dB \approx S/R$ for this definition.

"occupied" bandwidth method

This occupied bandwidth is defined as $BW_{occupied} = 1.19 \times S/R$

The signal level is down by about 10dB at the edges of the occupied bandwidth

"allocation" bandwidth method

This method provides a little guard-band between adjacent DATV signals. Allocation bandwidth uses formula $BW_{allocation} = 1.33 \times S/R$

This formula is equivalent to measuring at down about 26 dB

An ONLINE BW CALCULATOR is listed in Related DATV Links.

It seems to us that the "allocation" bandwidth is the most meaningful value of bandwidth for people trying to determine how many DATV stations to squeeze into a band plan. Significant power would overlap frequencies if we spaced several DATV stations "shoulder-to-shoulder" on their 1/2-power-points...hence potential interference.

See the OCARC TechTalk81 article (listed in Related DATV Links) for even more in-depth details on DVB-S RF Bandwidth.



DB0SRS DATV Repeater Design

The DB0SRS repeater, located in Steinau an der Strasse, about 60 KM East of Frankfurt, is one of several DATV repeaters operated by Stefan Reimann DG8FAC (of SR-Systems).

- FM Analog Uplink on 1,2 GHz
- DVB-T relaying from DB0LWK & DB0CWS repeaters
- DVB-S2 relaying from DB0NQ repeater
- FM relaying from DB0HAU & DB0HAU repeaters
- DVB-T Downlink on 3,4 GHz
- Six Transport Streams (6xTS) with 12 Pictures (PIDs)
- Internet-streaming to the DB0CWS repeater

Stefan DG8FAC explained that "...In D-ATV we don't need special LINK QRGs, we perform monitoring and filter out the PIDs which we don't need, so we select from 16 Programs for the repeater. The Ethernet connections from the MiniMUX Boards are connected to a standard D-Link 5-port 10/100Mbps switch, on this switch we have also connect the PC and D-Star. The 6xTS DB0SRS then transmits 12 Programs, each with net-Data-Rate of 2.5 Mbps in the D1 Resolution

(720*576 PAL) and 64kBit Audio Dual Channel mode."

Although there is no "internet streaming" to a central streaming location (such as D-ATV.net), DB0SRS does place a small Internet connection, on the other side is the DB0CWS repeater, this is the "Internet" entry point. Finally, note that the DB0NQ repeater is being received as DVB-S2, the modulation is 16APSK with FEC=8/9 and 13,5 MSymbol/sec for total net-data-bit-rate of 47,56Mbit/sec and 18 MHz RF Bandwidth.

Stefan has implemented a very interesting design to reduce delays that cause DATV latency. If you look at the DB0SRS block diagram in Fig 13, you can spot that three of the DATV receivers are "NIM" tuner boards (sold by SR-Systems). The NIM tuner delivers a TransportStream (TS) directly to a DVB-T exciter board and eliminates the extra MPEG-2 decoding and encoding that is required when using an STB receiver. This eliminates one set of MPEG-2 decode delays and one set of MPEG-2 encoder delays from the repeater. A comparison of MPEG-2 delays between NIM Tuner and STB is shown in Fig 14.

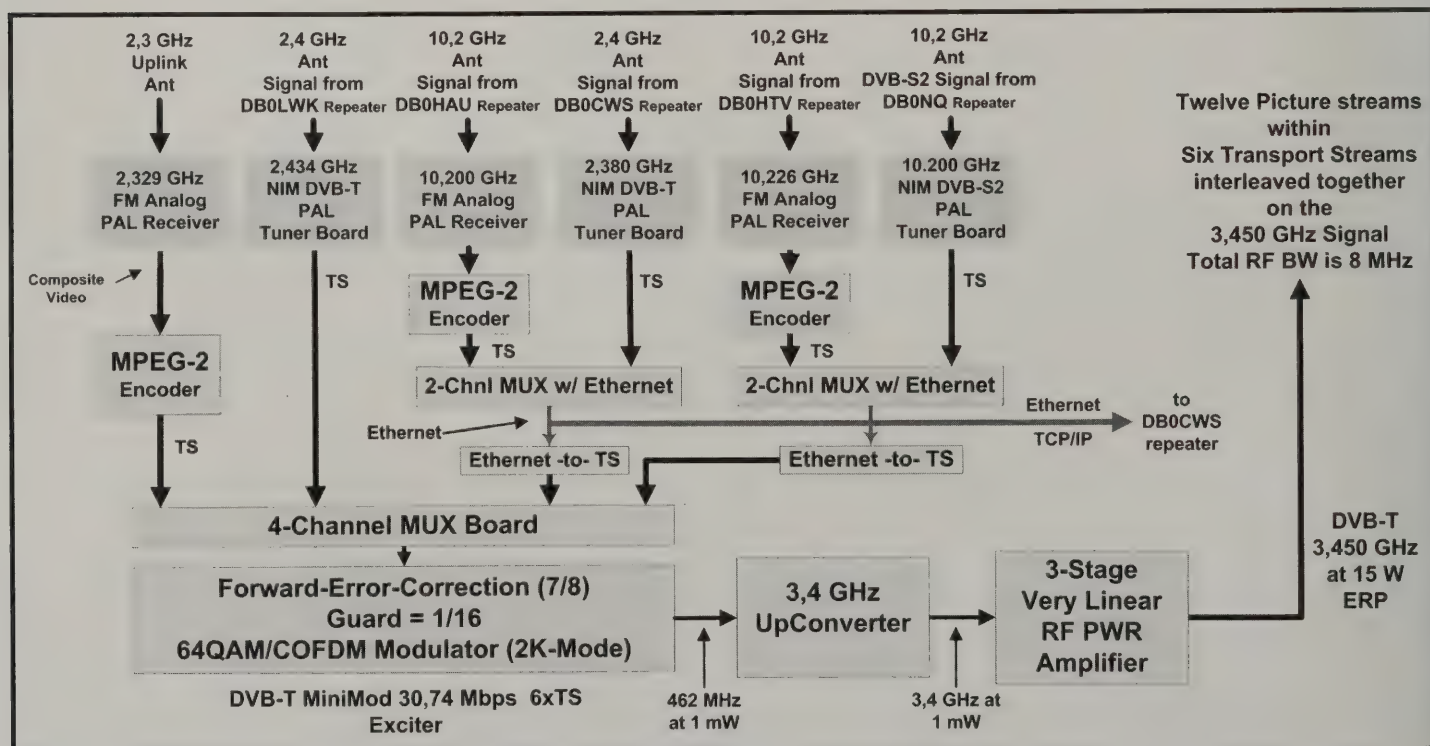


Figure 13 - Block diagram showing the DB0SRS repeater design

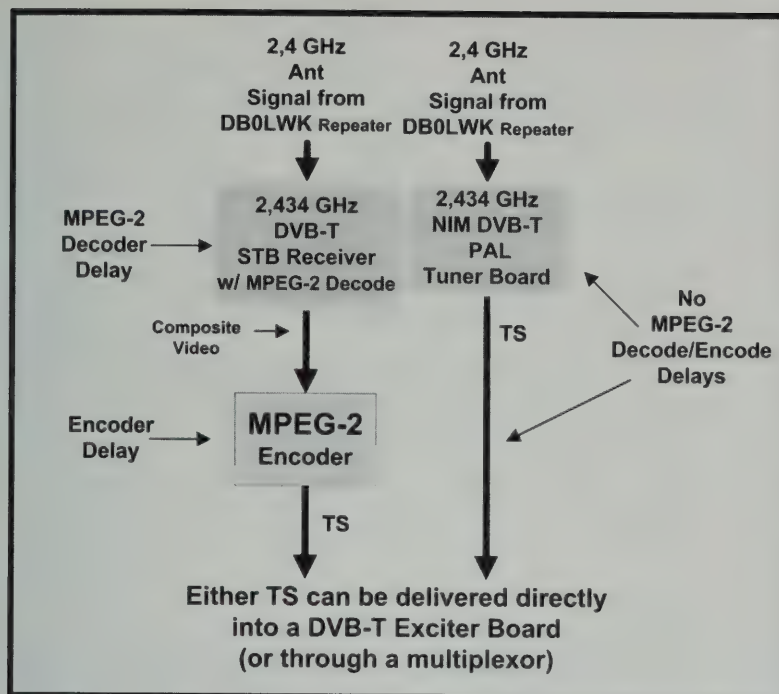


Figure 14 - Comparing NIM Tuner with STB. NIM avoids any Decode/Encode delays being added.

Acknowledgements

We would like to give special thanks to Peter Cossins VK3BFG for sharing detailed information on the VK3RTV DATV repeater and for answering our many questions.... and also to Art Towslee WA8RMC for sharing detailed information on the WR8ATV DATV repeater and answering our many questions.

We would like to thank Darren G7LWT, Graham G3VZV and Klaus DL4KCK for suggesting DATV repeaters in Europe for this article and providing contact information.

Next, a special thank you each to:

Dave Mann G8ADM for sharing information on the GB3BH repeater

Gavin Nesbitt M1BXF and Brian Shaw G6HFS for sharing info on the GB3PV repeater

Rob Swinbank M0DTS for sharing info on the GB3KM repeater

Hans Hass DC8UE for sharing info on the DB0DLH repeater

Stefan Reimann DG8FAC for sharing info on the DB0SRS repeater.

ATVQ

Useful DATV Links

- British ATV Club - Digital Forum – see www.BATC.org.UK/forum/
- Melbourne DATV Station VK3RTV – see www.VK3RTV.com/latest.html
- Amateur Television of Central Ohio WR8ATV – see www.ATCO.TV
- South West Herts UHF Group – GB3BH – see www.GB3BH.com/
- Cambridge Repeater Group – GB3PV – see www.CambridgeRepeaters.net/?page_id=13
- Kirk Merrington ATV Repeater – GB3KM – see www.M0DTS.co.uk/GB3KM/
- Lufthansa Radio Club Hamburg DB0DLH streaming via VLC-mode – see www.d-atv.net/db0dlh.asx
- Lufthansa Radio Club Hamburg DB0DLH streaming via NVS-mode – see www.d-atv.net/db0dlh.m3u
- SR-Systems D-ATV boards for Hams – see www.D-ATV.org/
- British ATV Club – select from about 25 streaming repeaters – see www.BATC.TV/
- Nick Sayer N6QQQ site for his future DATV ATSC repeater – see www.N6QQQ.org
- Orange County ARC newsletter series of DATV articles – see www.W6ZE.org/DATV/
- TAPR Digital Communications Conference free proceeding papers – see www.TAPR.org/pub_dcc.html
- Rob Swinbank M0DTS details of “Poor Man's DATV Transmitter LIVE update” – see www.M0DTS.co.uk/datv.htm
- Ultimate Resource for Digital Amateur Television – see www.D-ATV.com
- RF Bandwidth online calculator for DVB-S & DVB-S2 – see www.satellite-calculations.com/Satellite/bitrates.htm

Amplifier Linearization

- Mike Collis WA6SVT (drawings by Bob Miller W6KGE)

P.O. Box 1594

Crestline, CA 92325

email: wa6svt@atvquarterly.com

AMPLIFIER LINEARIZATION IN A DIGITAL WORLD

This article is a discussion about the current type of amplifiers most hams have used, their shortcomings and ways to improve them.

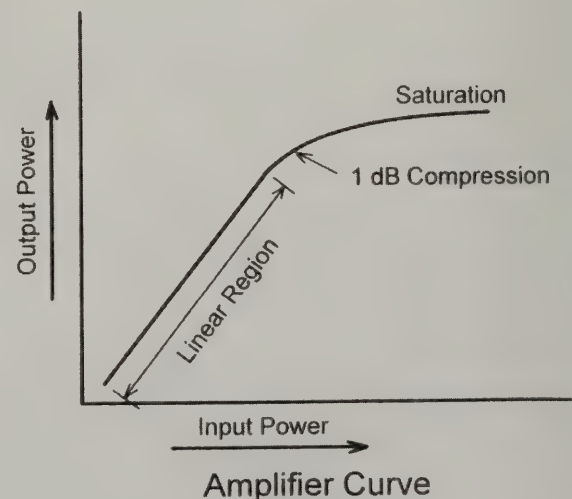
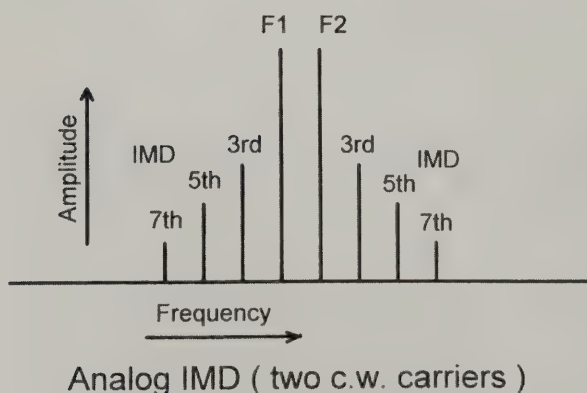
For years hams have used SSB capable linear amplifiers for ATV with the power backed down. This worked fairly well with AM ATV but not so well with analog VSB or QPSK digital ATV signals. The three primary shortcomings of the amplifiers are gain compression, bias and power bypassing and intermodulation distortion (IMD).

Bypassing is the easiest to fix; it is done by adding capacitors to both the bias and collector or drain supplies to stiffen them up during sync or peak signal portions of the modulation. Many ham amplifiers did not provide adequate filtering as needed for complex ATV and QPSK waveforms but some manufacturers

active devices.

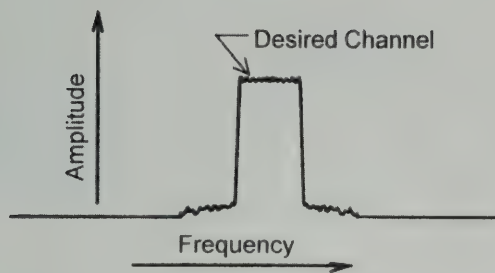
Amplifier class is also important for both efficiency and distortion levels. Class A is best for low distortion but has very low efficiency and usually not used for high power final amplifiers. Class AB is much more efficient but distortion at the upper end of the power curve is much higher than class A, class AB is the normal choice for final and driver amplifiers.

Amplifiers have a gain curve that starts out linear then the gain reduces then saturates as RF drive increases. Amplifier power output is usually rated at both the 1 dB compression point and saturated power output. Most typical ham amplifiers are rated at or near the saturated end of the curve. The 1 dB compression point is usually about 60 to 70% of the saturated output. It is best to not drive an amplifier past the 1 dB compression point during sync time for analog and lower than that for digital.



made modifications to make them ATV compliant. We can improve most amplifiers by using low ESR (low series resistance) rated capacitors to provide a stiffer supply to the active amplifier devices. RFC choke wire size needs to be large enough to reduce voltage drop to provide the stiff DC supply to the

As the RF drive increases, a change in the junction capacitance and internal resistance will occur. This will cause phase shifting (AM/PM) and compression (AM/AM) these are the primary causes of IMD. Two



Clean Signal After Feed Forward
Compensated Amplifier

tone testing is one way to test an amplifier for IMD performance.

The procedure is done with two carriers of equal level and a usually a few megahertz separation for testing. Looking at analog a VSB signal at the output of the power amplifier you see the effect of IMD as drive levels are increased, the lower aural carrier starts regenerating and its level is an indicator of the amplifier's IMD distortion performance.

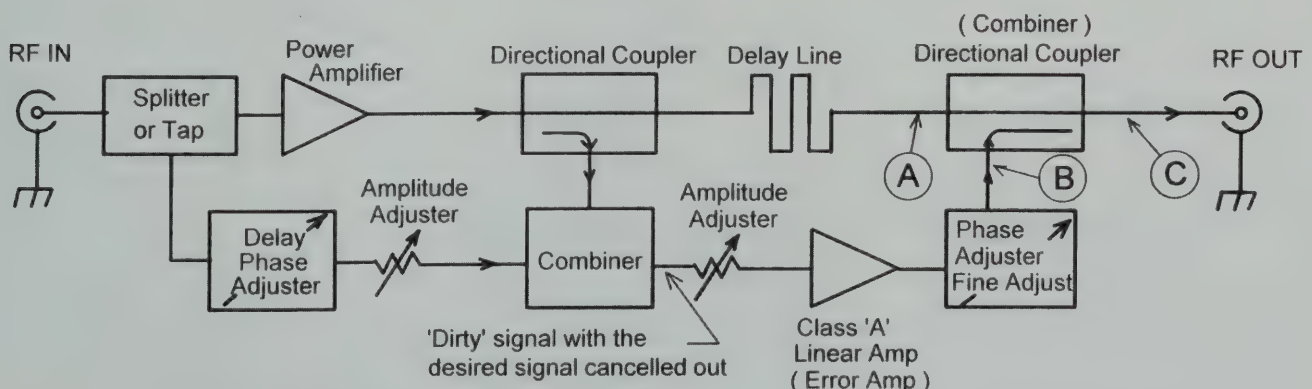
RF amplifiers using 24 volt devices have lower IMD responses than 12 volt devices. LDMOS devices usually have lower IMD responses than bipolar ones. Bias will affect the gain curve; increasing bias will extend the linear portion of the curve at the expense of efficiency and heat. Amplifier tuning especially loading has an effect on IMD as well.

Although most of the amplifier distortion outside the desired signal channel can be filtered out with an external filter, the IMD is also present within the desired channel causing visible beat patterns with AM or VSB analog and will cause the constellation pattern to distort, EVM and signal to noise will worsen with digital signals. As the drive is increased, IMD increases till at some point the signal cannot be demodulated.

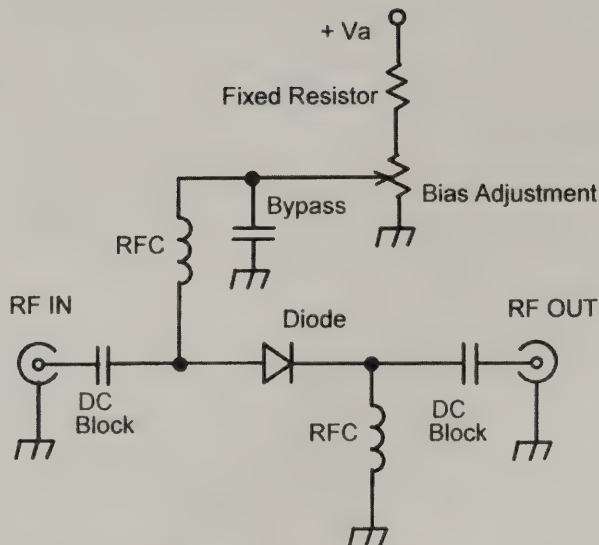
ATV operators have for years put up with IMD on AM or VSB analog and some turning up the sync stretcher level and RF drive to allow pushing the amplifier past the 1 dB compression point to get as much power as needed for ATV DX.

We cannot do the same thing with digital and usually amplifiers used for digital ATV have had to be used backed off well below the 1 db compression point, this is the peak of the signal and digital is measured as average power. Average level is 7 to 10 dB below the peak. An amplifier with a CW power output of 100 watts has its 1 dB compression point about 70 watts (sync in analog ATV) its digital average power is about 15 watts.

Cont. on Page 20



The signal with high levels of IMD at (A) is combined with the out of phase 'dirty' IMD signal from (B) which cancels the IMD, to produce a desired clean clean signal with 20 to 30 dB lower IMD at (C)



Series Diode Pre-Distortion (Low Power)

About 6 dB Improvement in Lowering IMD

and equal level to the IMD level from the power amplifier using a second set of phase and amplitude adjusters to minimize the power amplifier's IMD products by 20 to 30 dB in many good amplifiers and at least 15 dB with other less performing amplifiers. DSP processing can be used to make the process more dynamic for different power output levels, temperature and power supply changes.

Pre-distortion is usually used in small hand held digital units. A simple version can be done with a diode in series with the RF path prior to the driver amplifier and is slightly biased and its parameters chosen to compliment the drive levels used. The bias current is adjustable to allow optimizing the pre-distortion; this method can give about a 6 dB improvement in lowering IMD.



Now that we know the shortcomings, how do we get around them for better analog and robust digital performance? Either pre-distortion or bucking out the distortion is the answer.

Most broadcast transmitters use feed forward techniques. It is done by dividing the drive signal into two paths; the first is through some delay between the splitter and power amplifier input (coax jumper) and the other path through a variable phase and amplitude adjuster into a combiner. The other combiner input samples the power amplifier's output via a directional coupler.

The combiner's output is first tested with a spectrum analyzer and the phase and amplitude adjusters before the combiner are set so the desired signal is minimized so the IMD (dirty) signal remains it is then connected to a very linear class A (error) amplifier to overcome directional coupler and adjuster losses.

The now amplified IMD is re-applied 180 degrees out of phase

Thinking Digital ATV?

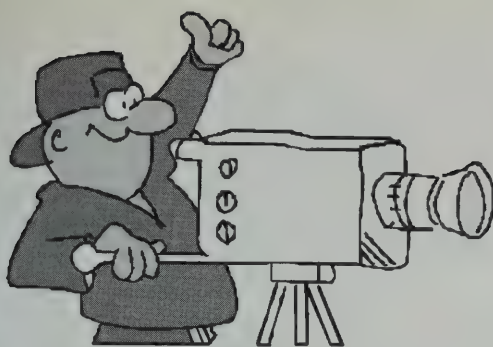
Two Digital ATV presentations from the 2009 ARRL/TAPR Digital Comm. Conference are now on DVD from ARVN. Also, WB8ELK talks ballooning, and 12 more high-tech seminars on the six-DVD set. Free preview on our web site!



more info, free previews at:
www.ARVideoNews.com
 e-mail kn4aq@arvideonews.com

**What's
 happening
 at your next
 club meeting?**

available only on
DVD
 VIDEO



Fun things!

To ORDER:

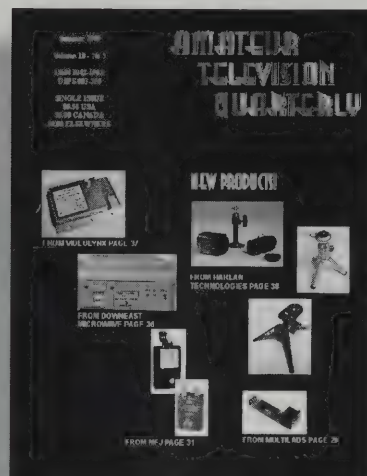
www.atvquarterly.com
wa6svt@atvquarterly.com
(909) 338-6887

First, and most important!

Keep informed about amateur television activities, projects, ATV DX information, SSTV, and other amateur radio video related activities, SUBSCRIBE NOW TO:

Amateur Television Quarterly

Rate	USA	Canada/ Mexico	DX
1 year	\$20	\$22	\$29
2 years	\$38	\$42	\$57
3 years	\$55	\$61	\$84
4 years	\$71	\$80	\$111
5 years	\$87	\$99	\$136
Life	\$399	\$439	\$579



ATV Secrets Vol I & II On CD

ATV Secrets is a great place to start your ATV adventure! Volume I has 64 pages, tightly packed with information covering all aspects of getting started, where to find activity, equipment, how to DX, and answers frequently asked questions about power, antennas, vestigial sideband operation and more. Everything the beginner in ATV needs!

Volume II is a mammoth book with 292 pages of technical material. More than 40 authors present over 90 technical projects and theory topics to fully acquaint anyone from novice to expert in the how and what of TV, video, and ham TV. Divided into 11 chapters, the book presents tested projects for all areas of interest in ham TV including antennas, amplifiers, repeaters, receivers, transmitters, video accessories, and more!

Volume II is sold out in the paper version, but available on CD.

ATV Secrets Volume One (paper) \$8.95

Shipping USA - \$4.50

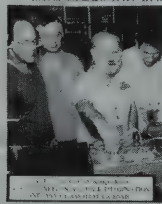
ATV Secrets I & II on CD \$25.00

Shipping USA - \$6.00

ATV SECRETS

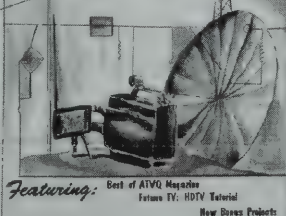
Featuring:

RAY IT, A BART AND DICKIE
ALL INTELLIGENCE IS GREAT ONE EASY
FOR THE BART
PUBLISHED BY THE
PUBLISHED BY THE
PUBLISHED BY THE
PUBLISHED BY THE

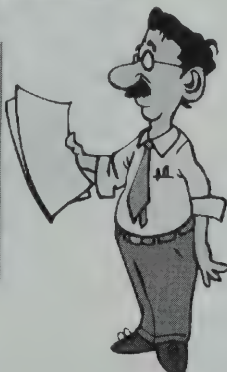
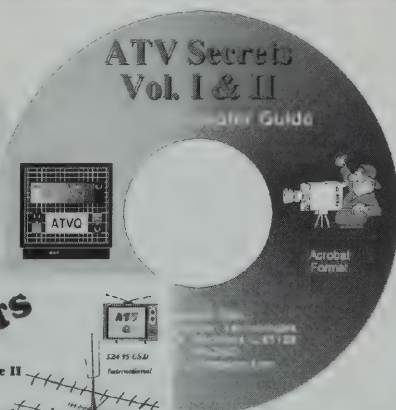


TV SECRETS Volume II

Television Topics
and Projects for
Novice to Expert



Featuring: Best of ATV Magazine
Future TV: HDV Tutorial
How Does Projects



White Tank ATV repeater on the air

- Mike Collis WA6SVT

Friday April 29, Peter KD7OIW and Mike WA6SVT re-installed the rebuilt 1253.25 MHz VSB repeater transmitter at White Tank Mt. located west of Pheonix. The repeater was originally built by Ward K7PO years ago. The current call of the repeater is WA6SVT. The repeater inputs are 434.0 MHz AM or VSB and 2441.5 MHz FM.

Coverage is great with ERP at 300 watts from the 180 ft tower on top of the 3900 ft mountain. Tim KG6IIE took the photos showing P5 quality from the repeater from over 60 miles to the east from his antenna located on his balcony!

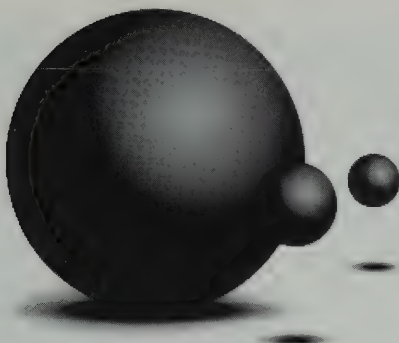
Future plans are to upgrade the controller and link the repeater to the one at Mt. Lemmon to the southeast near Tuscon and west to California. Mobile ATV was P5 were Peter and I drove. We even had ATV mobil QSOs all the way south to Gila Bend.

Output - 1253.25 MHz VSB modulation,
Input 1 - 434.0 MHz VSB or AM
Input 2 - 2441.5 MHz FM (audio subcarrier on 6.0 MHz.)



ATVQ





Harlan Technologies

Name Tags by Gene

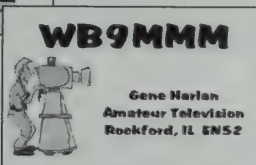
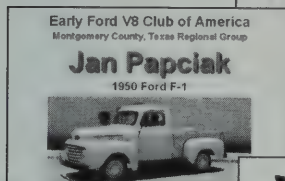
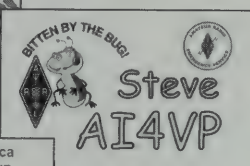
135 Wilson Ave., Machesney Park, IL 61115-2362

Phone: (815) 543-0894 or (815) 639-9175

Email: atvq@hampubs.com

Visit us on the web: www.hampubs.com

Producers of custom name tags, luggage tags, club badges, Employee Name Tags, Special Event Badges, Child / Stroller / Car Seat Emergency ID's, Amateur Television (Comtech) Transmitters & Receivers, Plus Video Camera's & Accessories



Name Tags

Beautiful, colorful, plastic name badges are available with clip, locking safety pin, magnetic bar, luggage strap, or lanyard. Check our samples at www.hampubs.com or make your own design. Any photo can be used, such as a club logo or we have many stock pictures to use as well.

Prices:

Name tag with clip \$10.00

Name tag with pin \$10.00

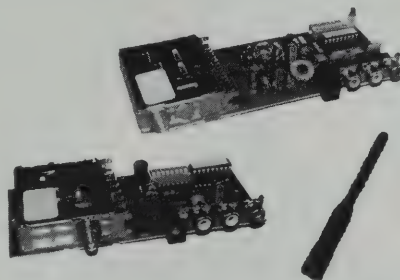
Name tag with magnet \$12.00

Name tag with lanyard \$12.00

Name tag with luggage strap \$10.00

Call or Email for Club & Quantity Pricing

Order form available online



Comtech Demo Boards

1.2 GHz ATV Receiver Demo Board
005-0030 \$69.95

1.2 GHz ATV Transmitter Demo Board
005-0029 \$69.95

2.4 GHz ATV DIP SW Receiver Demo Board
005-0050 \$69.95

2.4 GHz ATV PB Receiver Demo Board
005-0046 \$69.95

2.4 GHz ATV Transmitter Demo Board
200 mw!!!
005-0049 \$99.95

2.4 GHz ATV Transmitter Demo Board
005-0045 \$69.95

900/1200 MHz ATV Receiver Demo Board
005-0044 \$69.95

900/1200 MHz ATV Transmitter Demo Board
005-0043 \$69.95

Cable, 25 ft., camera, power & video
005-0019 \$14.95

Cable, 50 ft., camera, power and video
005-0020 \$19.95

Power Supply, 12 volt, 300 ma
005-0021 \$6.00

Antenna - 1.2 GHz Rubber Duck
005-0048 \$9.95

Antenna - 2.4 GHz Rubber Duck
005-0047 \$9.95

18 MHz IF Filter
D480A \$5.00

More available online

Name: _____

Call Sign: _____ Email: _____

Address: _____

City: _____ State: _____

Zip Code: _____ Phone: _____

Part Number:	Quantity:	Cost Each:	Total:



Sub Total: _____
Sales Tax (IL only 8.25%) _____

Shipping:
\$7.50 - 1st Item
\$2.50 each Additional Item

Shipping: _____
Total: _____

Credit Card Number: _____

Expiration Date: _____

Dayton Hamvention ATV

by Art Towslee WA8RMC (reprinted from ATCO Newsletter Vol 27-3)

Dayton was GREAT this year! For a change, the weather cooperated with only a hint of a sprinkle early on Friday morning. Otherwise, it was sunny and cool all weekend. I have not received official attendance estimates but by my observation, it seemed much like last year. There were a few more empty flea market spaces perhaps, but all in all, not bad.

The ATV forum was well attended and well represented with presentation topics. I tried to focus on individual ATV club activities this year with a few ATV clubs illustrating their activities. I hope to do the same next year if all agree. The pictures below say much more than I can so read on! WA8RMC (



On the left Tom, KA8ZNY and Phil, N8LRG keep an eye on their flea market space.



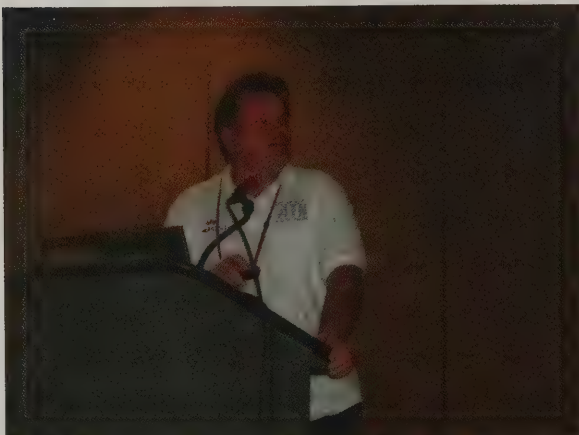
Right, Gordon West, WB6NOA dazzles the ATV forum audience with his "smoke" demonstration at the ATV forum.



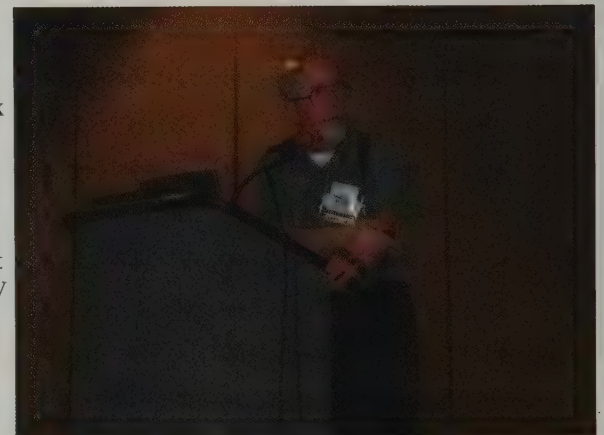
Left is Ron, K8DMR describing the Grand Rapids, Mich. ATV repeater system at the forum.



Right, Jessie, KB8OFF talks about the present and future DARA ATV repeater operation.



Left Mike, WA6SVT describes the complex California ATN repeater network.



Right, Ralph Taggart, WB8DQT talks about the early days of ATV and image communications.



Ron K3ZKO, Mike WA6SVT and Don KE6BXT man the ATN booth at the Hamvention.
(Photo by Art WA8RMC)



George K4GVT linked live ATV video from the flea market into his booth inside the arena.
(Photo by Bob N6EZV)



bob

basic overlay board

Decade Engineering's fourth generation low-cost video information overlay generators make last century's 'OSD' products look antique.

BOB-4 and XBOB-4 let your microcontroller or PC display text and vector graphics on standard TV monitors. With huge user-definable character sets, BOB-4 also supports bitmap graphics and multiple languages. BOB-4 generates background video on-board, or automatically genlocks to your video source and superimposes graphics over the image. Printable characters and commands drive BOB-4 through a fast RS-232 style port, much like a serial terminal or printer.

NTSC and PAL video standards are supported via software command. The free BOB-4 Conscriptor PC program simplifies configuration and font management.



- Simple hookup; requires just 9-12VDC, RS-232 data, video I/O
- Prints plain ASCII text in default configuration
- Display density up to 480x240 (NTSC) or 480x288 (PAL)

Display text and graphics from your PC on standard TV monitors.

- Stand-alone operation for video ID, target reticle, etc.
- Automatic vertical scrolling
- Text crawl (single-line smooth horizontal scroll)
- Expanded memory for custom fonts & bitmap graphics

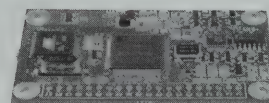


bob-4h

- Tiny and rugged; industrial temperature option
- Simple hookup; requires just 5VDC, data, video I/O
- Asynchronous 'TTL-232' and SPI control ports
- Prints plain ASCII text in default configuration

Display text and graphics from your microcontroller on standard TV monitors.

- Display density up to 480x240 (NTSC) or 480x288 (PAL)
- Text crawl (single-line smooth horizontal scroll)
- Off-board memory expansion for fonts & bitmap graphics
- Software-controlled digital outputs (5)



DECADE ENGINEERING

Ph: 503-743-3194 Fax: 503-743-2095 Turner, OR, USA www.decadenet.com

ATCO Red-White-Boom - our 15th year - by Art Towslee WA8RMC



Here's Bob W8RWR (left) and Tom KA8ZNY (right) viewing the multiple video displays on the Police HQ top floor.

WOW!!! It's been 15 years since we first started providing crowd security video for the Columbus, Ohio Police during the annual fireworks display. Since there's between 400,000 and 500,000 people converging on downtown Columbus to view the annual fireworks display, it's expected some confrontations could take place. Therefore it's ATCO's job to help provide crowd observation video for viewing at the Police Emergency Command Center for officer deployment if needed. Our video cameras located on the roof of selected building roof tops are microwaved to the EOC via 1270 and 2398 MHz. This year we had (2) remotely controlled pan/tilt cameras and (4) manually controlled ones to zoom in on suspected potential trouble spots. I think due in part to the unusually pleasant low humidity weather, no problems erupted. Only one safety issue was noted: a group of spectators tried to park themselves on a train bridge crossing the river. The Police promptly escorted them away.

The above left photo reveals the equipment complexity which took over one day to set up. Thanks to Tom, KA8ZNY for the majority of the sophistication. His joystick controlled fast pan cameras really made the job pleasant.

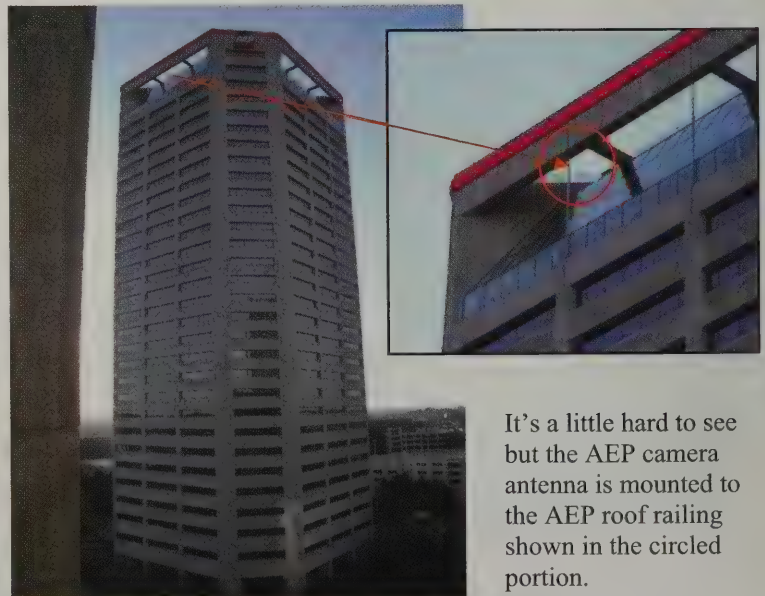


Above, Bob N8OCQ aims his camera to get a shot of the crowd below. He's on the Police HQ top floor balcony partially exposed to the outside. The helix receive antenna for the 2.4GHz video coming from the Gas Co. is in the center. The Gas Co. building is in the background.



The above picture is "around the corner" from N8OCQ's location. Bob, W8RWR is in the background. The 1270MHz can antenna is receiving video from the AEP building roof.

Below is the Gas Co. building. Our camera is next to the microwave antenna on the roof.



It's a little hard to see but the AEP camera antenna is mounted to the AEP roof railing shown in the circled portion.



This view is looking South and across the Olentangy river and the Broad street bridge in Columbus, Ohio. It's about 6PM so the main crowd hasn't arrived yet. The fireworks start at 10 so many more people are yet to come.

OK, now this is more like it! It's the same basic view but is about 1 hour later. Since the main food court is in the foreground, you can see where the people are.

Oh, I can smell those funnel cakes and brats even up here!



And finally, below is what everyone came to see! The fireworks display lasted for about ½ hour and was reported to be the best display in the Midwest USA. For us, we got home about 2AM!



ATVQ Editor Denise Camp SK

-Bill WB8ELK

This past April Amateur Television Quarterly Editor Denise Camp was rushed to the ER. She suffered respiratory failure and cardiac arrest on the way to the hospital. I was with her at the time as we were working on finishing up the winter 2010 ATVQ when she passed out. The fire department and the EMT's got to her within 5 minutes, but it was too late. She never regained consciousness and passed away peacefully on April 29th after several days in the ICU.

Denise was a great friend of mine for many years and an incredible writer and editor.

In addition to editing ATVQ, she has written numerous articles on a wide variety of topics in the past few issues.

She was particularly fascinated with the history of television and has been writing a series about Early Television. Her last installments will be published in upcoming issues.

An accomplished world-class and prolific writer, she has written articles and columns for numerous publications over the years.

She also wrote a book called Moonlight Madness that you can download from Amazon or Google Books. (*Do a Google search under "Denise Hawkins Camp" to find out more information on her works*).

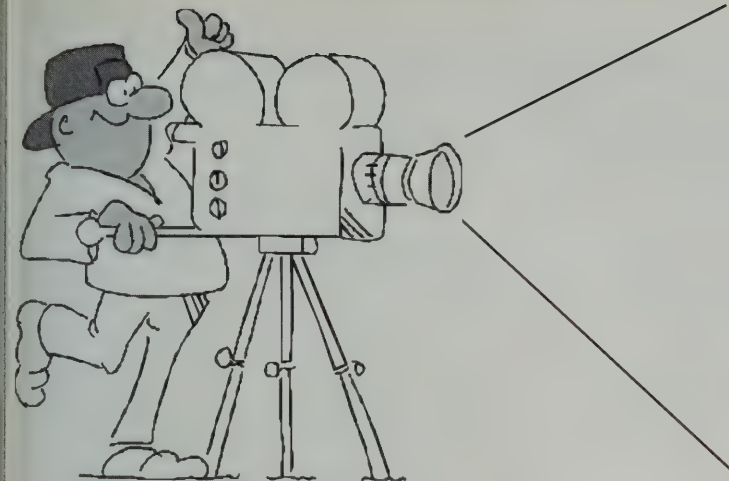


Denise was a member of several writer's groups and has encouraged and been an inspiration to many aspiring writers.

She was devoted to her family and her grandchildren. A visit to grandma's house was anticipated with the same excitement as a trip to Disney World.

Denise touched our lives with her love, joy and creative spirit and she will be dearly missed.

ATVQ



ADVERTISE IN ATVQ!

ATV'ers are hams that build projects more than other hams. They have a varied background ranging from technician to engineer, and just might see a need for your product in their regular job as well as in their hobby. I hope to hear from you soon.

Please call TODAY!

Mike Collis - WA6SVT - Advertising
RESERVE YOUR SPACE TODAY!
 1-909-338-6887 - voice
 email: wa6svt@atvquarterly.com

DEADLINES

COVER DATE	COPY DEADLINE	TO PRINTER	MAILING DATE
WINTER	JANUARY 1	JANUARY 15	FEBRUARY 1
SPRING	APRIL 1	APRIL 15	MAY 1
SUMMER	JULY 1	JULY 15	AUGUST 1
FALL	OCTOBER 1	OCTOBER 15	NOVEMBER 1

AD RATES

Effective November 19, 2004

INSERTIONS PER YEAR

SIZE	1-3	4 up
FULL PAGE COLOR	\$650	\$500
FULL PAGE B&W	\$160	\$140
ADDITIONAL COLORS/PAGE	\$100	\$100
1/2 PAGE B&W H or V	\$110	\$80
1/4 PAGE B&W H or V	\$85	\$55
1/6 PAGE B&W H or V	\$55	\$38

Multi-page ads are billed at the combined rate based on frequency.

Covers are reserved for COLOR ads.

All typesetting and layout charges for non-camera ready ads will be added.

Covers II, III, IV \$30 extra.

If negatives are not provided for color ads, add \$50.

While we will try to adhere as close as possible to the above dates, we reserve the right to adjust as needed.

If material is going to be late, please call to check if it will meet our schedule. We will try to accommodate everyone as best as we can.

Camera ready art or negative film right reading down is acceptable.

Trim Size: 8 1/2 x 10 7/8
 Bleed Size: 1/8" beyond trim
 Live matter: 1/4" within border

ATV Quarterly reserves the right to reject any advertising which is not in keeping with the publishers standards. Previous acceptance of any ad will not prevent ATV Quarterly from exercising the right to refuse the same advertisement in the future. Advertising orders are subject to the terms on the current rate card. Advertisers assume all respon-

sibility and liability for any claims arising from advertisements and will protect the publisher from same.

ATV Quarterly will position ads in ATVQ at its discretion except in the case of preferred positions specifically covered by contract or agreement.

If, for any reason, the publisher fails to publish an advertisement, it will not be liable for any costs or damages, including direct or consequential damages.

Terms: All accounts not pre-paid are billed net 30 days. All accounts over 30 days are billed at 1 1/2% per month. Prompt payment is always appreciated.

RESERVE YOUR SPACE TODAY!

1-909-338-6887

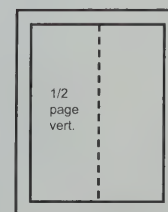
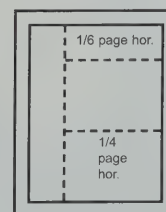
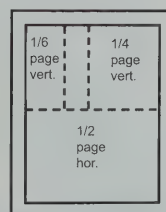
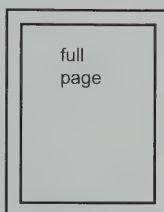
AD SIZES

VERTICAL

Width Height
 FULL PAGE 7" 10"
 1/2 PAGE 3 1/2" 10"
 1/4 PAGE 3 1/2" 5"
 1/6 PAGE 2 1/4" 5"

HORIZONTAL

Width Height
 --- ---
 1/2 PAGE 5" 3 1/2"
 1/6 PAGE 5" 2 1/4"

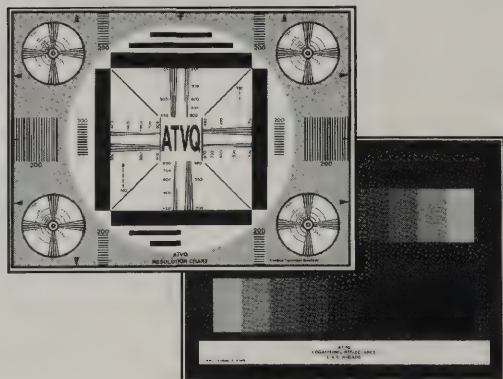


Amateur Television Quarterly

published by ATV Quarterly
 P.O. Box 1594, Crestline, CA 92325
 tel (909) 338-6887

Internet: <http://www.atvquarterly.com> email: wa6svt@atvquarterly.com

FULL COLOR TEST CHART



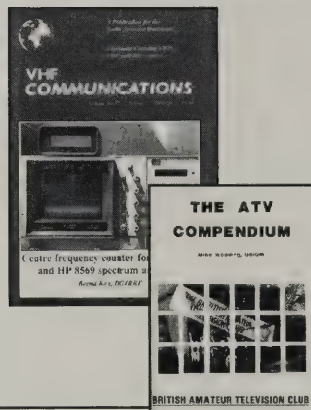
Four charts including:

COLOR BARS
RESOLUTION
GREY SCALE
REGISTRATION

To Order:

(909) 338-6887
www.atvquarterly.com

Only \$5.00 plus free shipping (USA)



VHF Communications

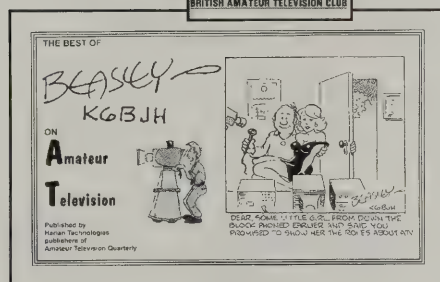
A quarterly publication from KM Publications in England that is a must for the technically minded. Lots and lots of articles for those that build projects in the VHF and above range.

One year \$44.00 (for 2008)

The ATV Compendium

Published by the BATC. A great technical book with articles applicable to UK and US systems.

Regular \$16.00 - Special \$10.00 plus \$4.00 shipping (USA)



The Best of Beasley - K6BJH - On Amateur Television

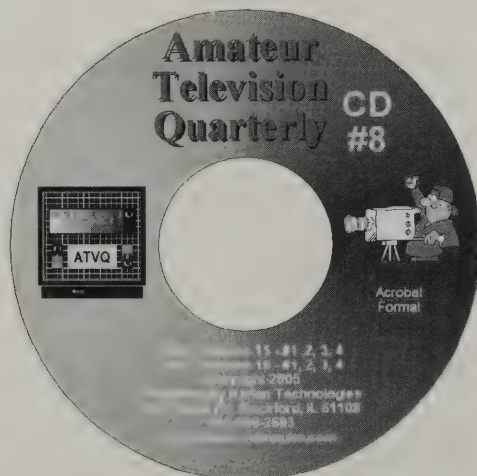
A collection of all the cartoons that have appeared in ATVQ over the years plus many more.

Regular \$8.95 - Special \$5.00 plus \$3.00 shipping (USA)

Previous issues of ATVQ

There are many super articles in the previous issues of ATVQ. We keep a list on www.atvquarterly.com what we still have in paper. You will also find a complete index of articles so you can find just what you want.

Single issues \$4.95 - Special 10 issues for \$30.00 - Shipping in the USA included!



ATVQ also on CD

CD 1 contains 1988 & 89 (6 issues)
CD 2 contains 1990 & 91 (8 issues)
CD 3 contains 1992 & 93 (8 issues)
CD 4 contains 1994 & 95 (8 issues)
CD 5 contains 1996 & 97 (8 issues)
CD 6 contains 1998 & 99 (8 issues)
CD 7 contains 2000 & 01 (8 issues)
CD 8 contains 2002 & 03 (8 issues)
CD 9 contains 2004 & 05 (8 issues)
CD 10 contains 2006 & 07 (8 issues)



Each CD \$15.00 plus 5.00 shipping USA

Special - all 10 CD s - \$109.00 plus \$8.00 shipping USA

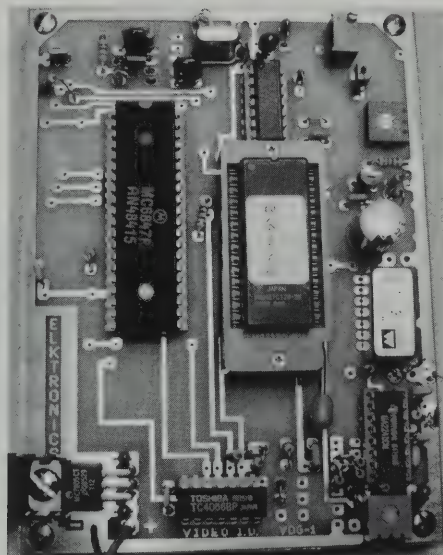
VDG-1 Video ID Board

Elktronics

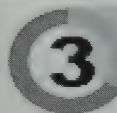
107 Woodlawn Drive
Madison, AL 35758
256-772-6000

email: wb8elk@aol.com
www.elktronics.com

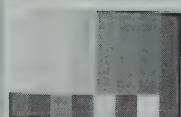
\$150 (includes 4 graphic screens)
\$20 for additional ID PROMs



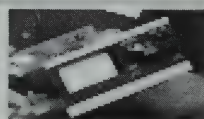
Film
Archive



Live
Events



ATV
Repeaters



Amateurlogic



Members
Streams

batec.tv ***Digital Television***

Join BATC for just £4 per year
and you get :-

CQ-TV magazine in Cyber format
sent to you PC as soon as it is available

Your own video stream on www.batec.tv

Join now via PayPal
at www.batec.org.uk

visit for more information

www.batec.tv

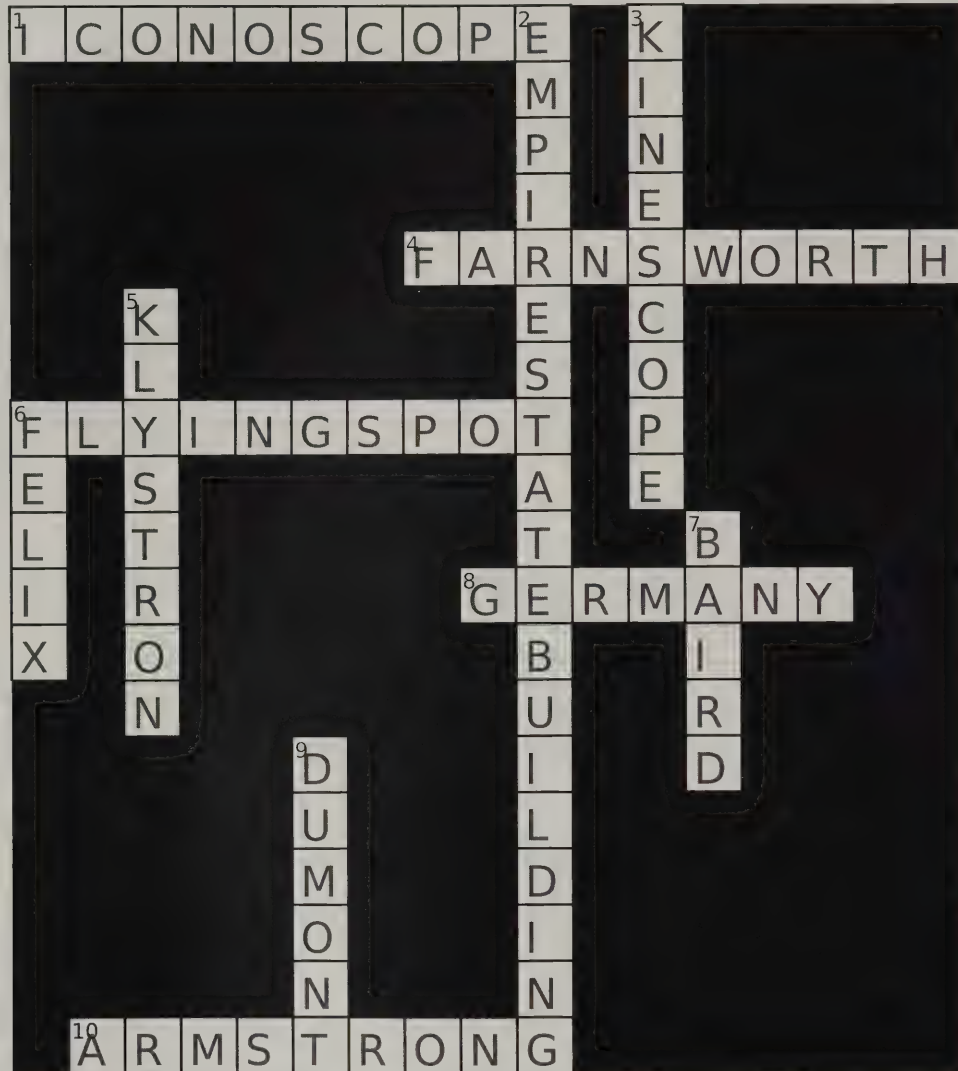
www.batec.org.uk

www.batec.org.uk/forum

Early TV Inventions

Denise Camp

Inventions and Inventors that made Television possible



Across

- 1 Early TV camera tube
- 4 RCA bought his patent for television for 1 million dollars in 1939
- 6 Manfred Von Ardenne's method of scanning film and images using a CRT (two words)
- 8 Country where first Olympics were televised
- 10 Inventor of FM modulation

Down

- 2 Location of first skyscraper TV broadcasts (3 words)
- 3 Early RCA picture tube
- 5 Varian Brother's Invention
- 6 Famous cat television star
- 7 Maker of The Junior Kit scanning disk TV system
- 9 This company made a 14" TV set in 1939

Thanks to all the fine stores that carry Amateur Television Quarterly

Burnaby Radio Comm Ltd. Ham Radio Outlet
4257 E. Hastings St. 2492 W. Victory Bl.
Burnaby, BC Burbank, CA 91506
Canada V5C 2J5

Gigaparts, Inc. Ham Radio Outlet
1426B Paramount Drive 933 N. Euclid St.
Huntsville, AL 35806 Anaheim, CA 92801

Ham Radio Outlet Radio City
1939 W. Dunlap Ave. 2663 County Rd I
Phoenix, AZ 85021 Mounds View, MN 55112

Ham Radio Outlet The Radio Place
6071 Buford Hwy 5675 A Power Inn Rd.
Atlanta, GA 30340 Sacramento, CA 95824

Ham Radio Outlet Do you know of a store
224 N. Broadway that would like to carry
Salem, NH 03079 ATVQ? Please let us know
and we will contact them.

ADVERTISERS INDEX

Amateur Television Quarterly	21,29,30
ATV Research	Cover 4
ARVideo News.....	20
Byers Chassis Kits	3
CQ-TV BATC.....	31
DCI.....	Cover 3
Decade Engineering.....	25
Elktronics.....	31
Gigaparts	Cover 2
the HAM STATION	34
Harlan Technologies.....	23
Intuitive Circuits, LLC	3,5
M2 Inc	34
R.F. Connection.....	5
TV-Amateur	3
VHF Communications	3

Please mention that you saw it in
Amateur Television Quarterly!

CONTRIBUTORS GUIDE

Preferred method of receiving articles is from **Microsoft Word**, **Open Office** or **ASCII Text**, followed by **typewritten** or **hand written** (clearly). Diagrams or pictures (B&W or Color) can be sent in hard copy, or if you scan them in, save to TIF, JPG or BMP formats (actually I can read about anything). If you send a computer disk, make sure it is PC (not MAC) format. When sending in digital photos or scanned photos, please send us the highest possible resolution for best quality when we print it.

Article submissions can be sent to:

Bill Brown WB8ELK
107 Woodlawn Dr.
Madison, AL 35758

or to our email address: wb8elk@atvquarterly.com

Also note our web page address: <http://www.atvquarterly.com>

The New N² AMERICAN Antenna

WE'RE YOUR ATV ANTENNA SOURCE

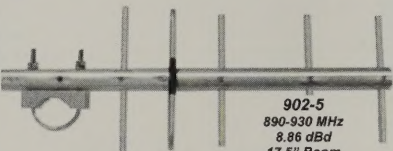
New licensed Hams will find the **440-6SS** a low cost, medium performance antenna to be a great choice for a starter antenna without compromising quality. Built with size and portability in mind, this antenna is great for Field Days, Mountain Topping, Fox Hunts, DXpeditions and ATV use. The antenna breaks down to no more than 36" long, making it a natural for trips.

MSRP \$ 78.00

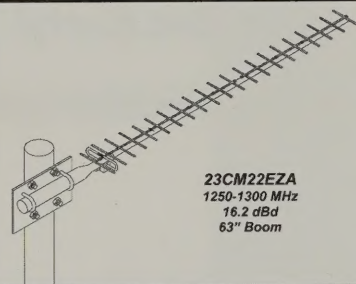


440-6SS
420-450 MHz
8.86 dBd
36" Boom

The New **902-5** is a versatile antenna that uses the latest computer design and features. The **902-5** is manufactured by a new CNC computer controlled machine capable of duplicating the exact performance every time. No measuring is required by the end user all element components are assembled at the factory. Assembly time is under 5 minutes. **MSRP \$ 85.00**

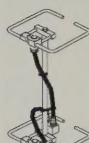


902-5
890-930 MHz
8.86 dBd
17.5" Boom

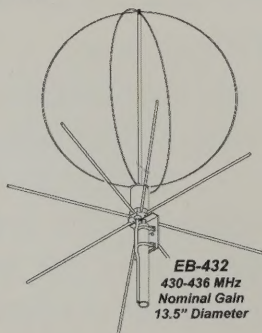


23CM22EZA
1250-1300 MHz
16.2 dBd
63" Boom

Horizontally Omni's are the best choice for base applications. Both the Ho Loop and Eggbeater series are the a match. A stacked pair of **432 HO** Loops increases performance to 8.8 dBd at 4°. The **EB-432** with the radial kit installed, increases the circular lobe by 6 db for a clean match.



432 HO
439-250 MHz
(2) Stacked 8.8 dbd
4 3/4" Square



EB-432
430-436 MHz
Nominal Gain
13.5" Diameter

m2 ANTENNA SYSTEMS, INC.

4402 N. SELLANO AVE.

FRESNO, CA 93722

559.432.8873 FAX 559.432.3059

WWW.M2INC.COM

Payment for Technical Articles

ATVQ will pay for certain articles that it publishes. I will outline the policy here, but it will be subject to change as needed to make sure that ATVQ continues to be an ongoing publication. ATVQ will pay \$25.00 for technical articles that are published and are a minimum of 2 pages. While this is not a great amount, I hope it will encourage more technical type articles to be written. Exceptions will be articles that are written by a manufacturer/seller of equipment that is being written about. While I do not want to discourage this type of article, the article itself is an advertisement of the product. Articles from clubs will be encouraged, and I would expect they would like to share their information with the ATVQ readership. Information gathered from the Internet will not be paid for and is mostly small filler items.

Ideas

Do you have an idea for an article that you've said to yourself that you wanted to write, but never did. Feel free to check with us to see if it is of interest, or write and send it in. No guarantees that it will get published, but if you don't try, you will never know. I'll be looking to see what you can do!

Advertise in ATVQ

Reach a new audience!

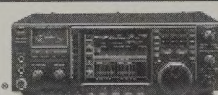
Call Today

909-338-6887



IC-746PRO
HF/6m/2m, 100w

ICOM



IC-756 PRO III
HF/6m, 100w,
32 Bit IF-DSP

IC-U82

IC-V82

IC-V82 VHF Ver.

IC-U82 UHF Ver.



**Celebrating
27 Years**



IC-V8000
2 meter, 75w



IC-2820H
2m/440MHz



IC-7800
160-6m@200w, All Mode

IC-7000

160m-10m/6m/2m/
70cm/IF DSP/Color
TFT Display



IC-706 MKIIG
160- 10m/6m/2m/70cm



**the
HAM STATION**

P.O. Box 6522
220 N. Fulton Avenue
Evansville, IN 47719-0522

Store Hours (cst)

Mon-Fri 8AM-4PM

800-729-4373

812-422-0231

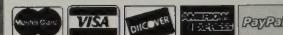
FAX 866-810-9292

www.hamstation.com

e-mail:sales@hamstation.com

**LARGE SELECTION
OF USED GEAR**

Prices Do Not Include Shipping.
Price and Availability Subject to
Change Without Notice
Most Orders Shipped The Same Day





About Us

Digital Communications Inc.(DCI) specializes in the design and manufacturing of bandpass filters, low pass filters, Wi-Fi filters, multiple-window filters, combiners, broadband duplexers, and CDMA repeaters in the 30 MHz to 6 GHz range.

Whether you require filters from our large inventory of commonly made filters or a custom design, our high performance products are made with steep skirts, low loss, low SWR and we can accommodate low and high power requirements.

Our filters are rugged, reliable and designed to last. They are made from extruded aluminum and brass to maintain the highest degree of tolerance and quality. We mill all our products in house on state of the art milling machines.

Skilled engineers and sales professionals work closely with customers to come up with specific solutions to unique RFI problems. Our products are premium quality, manufactured on site and competitively priced.

Our customers include amateur radio, amateur television, cellular providers, digital television companies, FM broadcasting stations, trunking specialists, Wi-Fi providers, the transportation industry, medical facilities, the military, audio recording, and satellite groups.

☒I have used DCI filters in designing and building Amateur TV Network repeaters, master receive multi couplers to provide ATV, 440-445 MHz amateur, 450-470 MHz land mobile at commercial radio sites and mask filters for broadcast TV. I highly recommend this company☒

"Michael Collis WA6SVT broadcast engineer and ATVer".

Let us Help you with your project. Contact us:

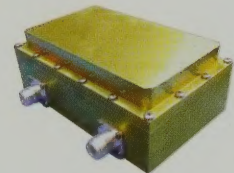
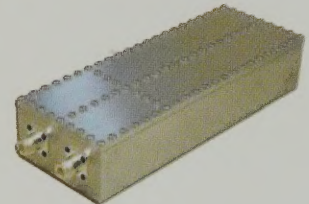
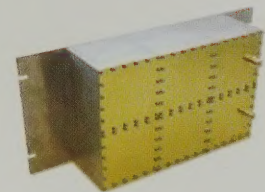
Web: www.dci.ca

Email: info@dcic.ca

Sales: Curt Tuttle, National Sales Manager:

Phone: (404) 254-3426

Mobile: (404) 432-3585



**Serving the video
needs of
amateurs and
industry
since 1964**

AT

C.

- * Cameras**
- * DVR's**
- * Monitors**
- * Modulators**
- * Wireless**
- * IP Video**
- * Amplifiers**
- * Filters**
- * Demodulators**
- * Converters**
- * Cable Headends**
- and much more**



**Stay abreast
of the latest
advances
in video
technology by
visiting us
on the web.**

*** Daily Updates ***

www.atvresearch.com

- * All New Site**
- * 24/7 Shopping Cart**
- * Over 75 years tech expertise**

**Toll Free: (800) 392-3922
General Ph: (402) 987-3771
24 hr fax: (402) 987-3709
Website: www.atvresearch.com
Email: sales@atvresearch.com**